HOUSING DIVERSITY AND CONSOLIDATION IN LOW INCOME COLONIAS: PATTERNS OF HOUSE FORM AND HOUSEHOLD ARRANGEMENTS IN COLONIAS OF THE US – MEXICO BORDER

A Dissertation

by

CARLOS ALBERTO REIMERS-ARIAS

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2009

Major Subject: Architecture

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Approved by:

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ABSTRACT

Housing Diversity and Consolidation in Low-Income Colonias: Patterns of House Form and Household Arrangements in Colonias of the US-Mexico Border.

(August 2009)

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Colonias are low-income settlements on the US-Mexico border characterized by poor infrastructure, minimum services, and an active housing construction with a high self-help and self-management component. Housing in colonias is very diverse showing house forms that include temporary and permanent structures, campers, trailers or manufactured houses and conventional homes. Most of this housing does not meet construction standards and codes and is considered substandard. Colonias households are also of diverse nature and composition including single households, nuclear and extended families, as well as multiple households sharing lots. This wide variety of house forms and households in colonias fits poorly within the nuclear household, single family detached housing idealized by conventional low-income housing projects, programs and policies. As a result, colonias marginally benefit from the resources available to them and continue to depend mostly on the individual efforts of their inhabitants.

This research identifies the housing diversity and the process of housing consolidation in colonias of the US-Mexico border by looking at the patterns of house form and household arrangements in colonias of South Texas. Ten colonias located to the east of the city of Laredo along Highway 359 in Webb County, Texas were selected based on their characteristics, data availability and accessibility. Data collected included periodic aerial images of the colonias spanning a period of 28 years, household information from the 2000 census disaggregated at the block level for these colonias, and information from a field survey and a semi structured interview made to a random sample of 123 households between February and June 2007. The survey collected information about house form and household characteristics. The survey also incorporated descriptive accounts on how households completed their house from the initial structure built or set on the lot until the current house form. Data was compiled and analyzed using simple statistical methods looking for identifiable patterns on house form and household characteristics and changes over time.

Findings showed that housing in colonias is built and consolidated following identifiable patterns of successive changes to the house form. Findings also showed that households in colonias share characteristics that change over time in similar ways. These results suggest similarities of colonias with extra-legal settlements in other developing areas. Based on these findings, the study reflects on possible considerations that could improve the impact of projects, programs and policies directed to support colonias and improve colonias housing.

To my son Ivan Gabriel

Because you represent the best of

my optimism, trust and hope in the future

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NOMENCLATURE

Basic Housing	Formal housing strategies based on progressive development, incremental housing, and self-help methods.
Colonias	Low-income settlements on the 4 states of the US-Mexico border located out of city limits and within certain proximity of the border, with poor infrastructure, services, and standards and characterized by incremental housing.
Contract for Deed	Legal arrangement commonly used to purchase lots in colonias.
E.D.A.	Economically Distressed Areas. Areas with median household income 75% or lower than the state's median.
E.T.J.	Extra Territorial Jurisdiction of cities. Beyond city limits regulations and codes.
Extra-legal Settlements	Settlements built out of urban limits and not subject to city urbanization standards, building codes and regulations.
Housing Consolidation	Process by which housing is progressively built over time up to acceptable standards.
House Form	Structure or structures on the land that constitute the homestead of a household.
Informal Housing	Housing built without regard and compliance of formal codes, regulations and standards.
Informal Settlement or Irregular Settlements	Settlements built out of the formal regulatory framework of a city or town.
M.S.R.	Model Subdivision Rules. Minimum development standards for colonias.

Progressive Development	Process by which housing is incrementally built on successive construction stages over time.
Promotor(a)s	Member or members of colonias recruited and trained to link communities with programs, assistance and resources available to colonias.
S.A.R.	*Stichting Architecten Research* (Architectural Research Foundation) Group founded in 1964 with the leadership of John Habraken to seek a body of knowledge in architectural theory and methods.
Self-Help Housing	Housing whose construction is managed and/or executed by its users or with their participation.
Squatter Settlements or Spontaneous Settlements	Informal housing characteristic of developing countries.
Sweat Equity	Term that describes the investment of household labor in the construction of self-help housing.
T.W.D.B.	Texas Water Development Board.
VISTA	Volunteers in Service to America. Members of a program created in 1965 by the Office of Economic Opportunity under the direction of Sarge Shriver as part of the War on Poverty programs launched by President Lyndon B. Johnson.

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1. INTRODUCTION: CONSOLIDATION IN THE COLONIAS

The US-Mexican border features a housing environment that displays diversity and constant change. These are the characteristics of *colonias*, the settlements that house more than half million low-income inhabitants in the south-western border of the United States. The southern region of Texas concentrates more than 400,000 of these colonia inhabitants (US Census Bureau, 2000). Texas legislation in colonias has served as reference for public policy in colonias at the regional and federal level in the US.

Previous research has shown that colonias represent a very affordable housing alternative for poor households which otherwise would be limited in their options for housing and their access to conventional home ownership (Mukherji, 2001; Ward, 2004). Colonias households can buy relatively inexpensive land with a low down payment and monthly installments and they can build their houses at their own pace and according to their capacities. The outcome of this particular and relatively slow process of urbanization contrasts sharply with the uniformity of conventional low-income housing developments. Colonias traditionally show a diversity of housing forms that reflects households' priorities and needs, and depends on the households' ability to afford their housing (see figure 1).

For these reasons researchers have highlighted the striking similarities between colonias and the self-built environments of the developing world (Graham and Pereau, 1992; Ward, 2001).

This dissertation follows the style of the *Journal of Architectural and Planning Research.*

Squatter settlements[1] in developing countries, also known as *informal settlements* due to their extra-legal origin, house a large percentage of the low-income population because the wide array of housing forms occurring in these unregulated settlements is able to accommodate the particular characteristics and needs of the poor. This research builds on this perspective by approaching the study of colonias within the larger field of housing in unregulated environments.

A simple look at the colonias of Texas reveals considerable diversity in a variety of house forms that include temporary shelters, used trailers, manufactured houses, incomplete structures built on-site and even well-finished houses. Diversity is also shown by the varied composition and characteristics of households living in colonia housing. Colonia households range from the nuclear to the extended multi-generational family. Sometimes households include other relatives, one or more tenants, and even more than one family group. Households of different characteristics have unique and often specific needs (see figures 2 and 3).

Research in low-income housing shows that housing diversity in informal housing reflects household differences (Turner and Mangin, 1968). The literature in housing also shows that the processes used to build housing by self-help methods incrementally or in piecemeal construction reflects that household characteristics and priorities change over time (Abrams, 1964; Turner and Mangin, 1968). Thus, not only are houses tailored to meet the spatial needs of households, but they keep being built, accommodating changes over the life of the household as resources become available

[1] Squatter settlements is a general term used to define housing usually produced by self-help means at the margin of formal planning mechanisms and minimum safety and health standards, codes and regulations. Also known as *bidonvilles* and *slums* in several countries, *barrios* in Colombia and Venezuela, *favelas* in Brazil, *pueblos jóvenes* in Peru, *villas miseria* in Argentina, etc.

Figure 1. Colonias housing diversity. A variety of house form structures that reflect the balance between households' needs for housing and their ability to afford them is a common view in the colonias (Tanquecitos II, Webb County-TX 2007).

Figure 2. House form diversity: self built housing structures. The image on the left shows a single household permanent house while the other image shows a multi-household compound of temporary and permanent structures (including a trailer on top of a concrete structure) sharing a lot (Larga Vista, Webb County-TX 2007)

Figure 3. House form diversity: conventional housing. Not all house forms in colonias are self-constructed. Well-finished single family detached houses built by commercial contractors, some of very high quality, are also seen (Larga Vista, Webb County-TX 2007)

Figure 4. Initial house forms. The first structure on the site shows occupation and allows moving into the colonia. The image on the left shows a structure built with reused plywood and windows while the image on the right shows a trailer initially set on the lot that has been expanded to the rear (Pueblo Nuevo, Webb County-TX 2007)

Figure 5. Attached additions. House forms are incrementally improved to accommodate the needs of growing households. The image on the left shows a porch added to an initial structure as well as a newer detached structure in the background. The image on the right shows that a room that has been added to the left of the initial manufactured house set on the lot (Pueblo Nuevo, Webb County-TX 2007)

Figure 6. Second floor additions. Second-floor additions to the initial structure are also commonly seen. The image on the left shows a partial second floor addition while the image on the right shows that the initial house form area has been doubled with a second floor (Pueblo Nuevo, Webb County-TX 2007)

(ibid) (see figures 4 and 5). The process by which initially basic and even precarious forms of shelter are built upon and improved in continuous stages until they eventually evolve into lasting and durable housing is known as "housing consolidation" or "progressive development" (Laquian, 1977) (see figure 6). The fit between household and house form achieved by progressive development is what makes self-help housing affordable to its households. Investment in housing occurs as households have the resources required.

In the Texas colonias, research has shown that, in addition to offering an affordable alternative to housing, progressive development is in fact a mechanism that allows low-income households to accumulate capital (Ward et al., 2004: 2641). Studies in colonias show that housing improvement and consolidation, more than any other issue, is the main factor raising property value and generating housing equity for low-income colonia inhabitants.[2]

1.1 The Tradition of Housing in Architecture

There is a long standing interest among scholars of the environmental design disciplines for issues related with housing the poor. The early work of Charles Abrams on the problems of housing in the US (1946) and analogue issues in developing countries (1966) was influential in the development of this interest. Following this lead, research by social scientists, anthropologists, urban planners and architects about the

[2] A study by Ward et al (2004) on the impact of a major land titling program in several colonias of Texas made by the Community Resources Group between 1995 and 2002 concluded that "… it is sweat equity by the people themselves, along with housing improvement, that raises the property value and which to give rise to some equity creation and to (rather modest) potential wealth creation."

effects of rapid urbanization in developing countries created a momentum that would keep active the housing movement for several decades to come. Special attention deserves the work of Talton Ray (1969) and Anthony Leeds (1972) describing the politics and characteristics of the growing Venezuelan *barrios,* and the research of Elizabeth and Anthony Leeds (1972) unweaving the intricate social patterns of the rapidly developing *favelas* of Brazil during the 1960s (1972). In architecture, the work of William Mangin and John Turner in the *pueblos jovenes* of Peru initially published in the architectural magazine Progressive Architecture (1968) and followed up by respective publications about the people (Mangin, 1970) and the processes observed in housing became turning point (Turner and Fichter, 1972; Bromley 2003).

Parallel to these developing events, a renewed curiosity for contemporary expressions of vernacular building forms and other "architectures with no pedigree" became also manifest among architects (Rudofsky, B. 1964). Between 1964 and 1965, the exhibition of "Architecture without Architects" at the MOMA of New York exposed the strong connection between the popular housing expressions of societies and the singularity of this "anonymous" architecture (Ibid). In a moment in which conventional modern mass housing projects were plagued by innumerable administrative, financial and cultural problems to house a growing urban population, the idea of a less "formal" housing involving the participation of people since its creation found ground in professional, academic and economic circles.

Many scholars and practitioners around the world turned their attention to the poor squatters and informal settlements in the urban peripheries of developing countries

looking for insights that could inform housing strategies and policies. The study of the relationships between cultures and vernacular expressions of housing (Rapoport, 1969; 1990; Alexander, 1969) and the development of experimental housing practices emphasizing traditional technologies and low-cost local materials (Fathy, 1973) found space in the architectural arena. Learnings from developing countries on a more direct participation of people in the housing production process found its connection with industrialized construction, participative housing schemes and user-responsive housing on developed countries in the work of Habraken's theory on "Supports" (1972) and the SAR [3]. The following decade was fertile for the development of conceptual frameworks for community participation and self-help and self-assisted housing (Turner, 1977; Alexander, 1977; 1985). Experiences were also developed in massive self-help housing strategies (Caminos and Goethert, 1975) and flexible basic housing programs (Laquian, 1983a) for the developing world. A continuous flow on research and reports on informal and spontaneous settlements showed that the impact of these efforts was very limited (Patton, 1988; Hardoy, 1989; Tipple and Willis, 1991). The unstoppable growth of urbanization in the cities of the developing world was far beyond the technical capacity to plan and build the amount of housing needed by new urban inhabitants. For international development agencies working in developing countries such as AID and the World Bank, self-help, flexible and progressive strategies for housing were taken a step further by enabling the poor to create and build their environments while providing

[3] The SAR stands for *Stichting Architecten Research* (Architecture Research Foundation) and it was a group formed in 1964 by architects of ten offices in the Netherlands that sought to create knowledge in theory and method on Architecture. John Nicolaas Habraken was the first director of the SAR, which became housed in the Technische Universiteit at Eindhoven, when Habraken was asked to create a new department of architecture in 1967.

the economic environment to promote development (Koenigsberger, 1986; Pugh, 1991; 2001). These strategies pushed even further away social scientists, planners and architects and put economists to lead a problem essentially environmental.

For architecture like for the other environmental design disciplines, this was a new call to review the functions to perform in this context (Burgess, 1982; Peattie, 1983). This was something that Turner had already predicted when he described his own process of reeducation as an architect as he became more involved in housing the poor (Turner, 1972:122). However, for some practitioners the task seemed beyond the participation of architecture in low-income housing. The idea of design as the physical manipulation of space with the ultimate objective of improving the lives of poor people, but with a not necessarily clear (or immediate) connection to an aesthetically pleasing result never permeated throughout the discipline (Van der Linden, 1994; Zanetta, 2001).

> … few architects and few clients in history managed to connect what architects did or what their art had to offer to the task of improving the conditions of the working class. Many architects were far too busy to notice 'the humble attempts to house design' that engaged small builders and self-helpers and were appearing all over, whether in the growing industrial cities or in the plotlands of southeast England (Hamdi, 1991:169)

During the last three decades, a small but consistent work by a reduced group of architects has increasingly attracted a limited interest from professionals, both in the developing and developed world. Hamdi (1991:46) promotes the inclusion of the common elements provided by research in housing: flexibility to allow the process of change brought by progressive development to unfold ensuring user fit, user participation to reestablish the connection between people and housing, and enablement which involves designing to allow change and growth. Others do not ignore the

importance of the knowledge that research has brought to the field, but insist that architects working in housing need to develop an "advocacy role" by active political engagement in seeking and promoting funding for low-income housing by governments and non-profits (Gutman, 2001:17; Bell, 2008). A number of experiences have become more popular supporting the incorporation of these notions early in architectural education in schemes of action-research, design-building, community design participation, and the like. Such are the cases of Auburn University's Rural Studio (Oppenheimer and Hursley, (2002), Rice University's Rice Building Workshop (Neuscheler, 2004), the Design Corps at Raleigh NC (Bell, 2004), the Pontificia Universidad Catolica's Elemental Housing Initiative in Chile (Murphy, 2006), and many others. Payne and Majale (2004) have also addressed governments at all levels offering practical tools to review regulatory frameworks in ways that both, enable the participation of people in the production of their environment, and guide development preserving safety and health.

As the flow of old and new ideas becomes part of our globalized reality, it is important to keep up with the work of understanding the issues concerning housing for the poor as these issues also become more complex. As poverty transcends geographic boundaries associated with broader phenomena that involve cultures and societies as well as economies and political systems, perhaps the chance to make a small contribution from the architectural perspective also increases. This is the purpose of this study.

1.2 Research Intent

This research looks at colonias' housing diversification and consolidation. The research investigates the way in which housing is built in the colonias of South Texas. The purpose of the study is to outline the process by which housing diversity is generated and improved over a period of time using diverse secondary data and testimonies of the households living in these colonias. The study also aims to identify the characteristics of the households that live and participate in this process and to explore relationships between households and house forms seeking for recognizable patterns and categories that can help to describe and understand this process.

1.3 Rationale

Previous studies show that households have been the main actors in the production of affordable housing in colonias. Although previous research and existing policy in colonias acknowledge the benefits of self-managed housing, the positive aspects of this process are thwarted by the scarcity of resources and the limitations of people managing the complexities involved in producing their built environment. These limitations result in negative and often urgent consequences for the safety, health, and quality of life of colonias inhabitants and their general residential environment. Unfortunately, federal and regional programs created to overcome these problems ignore many of the complex characteristics of colonias and the conditions in which its housing is generated.

The underlying principle supporting this research is that by reconstructing and analyzing the process by which housing in colonias is originated, diversified, and consolidated, and by exploring the characteristics of colonias' households and their relationship with their housing, it will be possible to identify and reinforce the strengths of this process, and direct the appropriate attention and resources to correct its weaknesses. The outcomes of this study will provide information that will allow to evaluate and, if needed, reformulate policy, programs and projects directed to assist housing in colonias.

1.4 Approaches and Methods

The research uses a mixed quantitative and qualitative approach. Data were gathered from various secondary sources and semi-structured interviews were made to a randomly selected sample of households. The secondary sources consisted of census data, maps of colonias and inventories made by the Texas Webb County Planning Department, and sequences of aerial images of the colonias taken over a span of 28 years by several entities. The interviews collected information about household characteristics and the way houses were built over time. These pieces of information were used to reconstruct and analyze the process of housing diversification and consolidation of the selected colonias sample.

1.5 Scope and Limitations of the Study

The research studies house form and household characteristics seeking patterns of configuration and patterns of change over time in ten colonias along the north side of Highway 359 in Webb County, Texas. The aim is to explain possible ways in which the housing stock of these specific colonias originated, diversified, and consolidated. It would be inappropriate to extrapolate the findings of this study to other colonias, even those with similar origin and characteristics, without carefully evaluating the set of contextual, historical, social and economic conditions of the latter. The implicit consequence of this consideration is that the results of this study are applicable only to the sample of the colonias studied and, by extension, useful to understand other households in the same colonias along Highway 359. Nevertheless, the methods and process by which this research was completed could be used as a model to approach similar studies in similar colonias of Texas to better understand the way colonias consolidate and diversify.

1.6 Structure of the Research

Including this introduction, this study is structured in seven sections. Section two includes a general background on colonias, reviews the literature on colonias and, more specifically, Texas colonias. It then focuses in existing research covering colonias housing within the larger context of progressive housing in extra-legal settlements.

Section three states the problem and the objectives of the research, and formulates the research questions.

Section four describes the methodology used in the study. It includes the criteria of selection of the sample colonias and the preliminary analyses made to design the survey instrument and plan the fieldwork. The section continues describing the fieldwork and providing a detailed account of the interviewing process. A descriptive summary of the characteristics of the colonias surveyed closes the section.

Section five presents the analysis of the data collected and general findings on colonias housing. The section expands in the specific analyses on house form and household change. Possible relationships between house form and household arrangement are explored. Finally, key examples of the housing diversity of the colonias surveyed are presented in greater detail and discussed closing the section.

Section six discusses the significance of findings within the context of the research and from the broader perspective of colonias housing.

Section seven presents the conclusions of the research and explores their possible implications in housing policies at the federal, regional, and local levels. It also proposes recommendations for further research.

2. LITERATURE REVIEW:
FROM A LOCAL TO A GLOBAL PERSPECTIVE OF COLONIAS

This section is a review of the broad nature of issues involved with colonias. The section begins presenting the phenomenon of colonias urbanization as it develops in Texas and other border states. A review of the different definitions given to colonias by the different entities involved with them, and the problems that these vague, ambiguous and even contradictory definitions have caused understanding colonias are presented. The section follows with an overview to the legislation on colonias during the last 20 years and its limited impact in contributing to the understanding of colonias and the characteristic of the assistance that has been developed and provided, as well as its limitations. Colonias are then reviewed on the light of research on similar informal or extralegal housing phenomena in the developing world. A special emphasis is made in the process of *progressive development* and housing consolidation observed in informal housing in developing countries and how it relates to colonias. Finally, a review on the existing research in housing colonias is presented to highlight the needs for further research in the issue of housing consolidation in US colonias.

2.1 Colonias: from Local to Regional

There are several definitions that fall under the term *colonia*. Most of them are vague, ambiguous or too broad. The word originates from the Spanish language and it literally means ‘colony.’ Its original and oldest conception is that of the territories on

unexplored lands that were occupied by foreign countries with or without the use of force. In the context of the US-Mexico border the term has old roots because this is land that once belonged to the Spanish kingdom. However, it is likely that the most appropriate reference to the term in the context of this research comes from its contemporary use in Mexico.

The word *colonia* is used to define residential neighborhoods in the surroundings areas of Mexican cities that are similar in many ways to the American suburbs. Within this connotation, the term has no particular undertone and it is used to describe middle-class as well as better-off suburban developments. The term is also used to name *informal settlements* in Mexico, that is, peri-urban low-income settlements built in undeveloped land oftentimes at the margin of building codes and regulations (Larson, 2005:140). Like in other developing countries, informal settlements (also known as *irregular settlements*) are a widespread phenomenon in Mexico's urban landscapes. These settlements have also been a common feature around cities along the Mexican border for several years receiving also the name of colonias (Staudt et al., 1998:121).

On the US side, the use of the term colonia to describe low-income settlements starts around the 1950s and could be even traced back to the beginning of the 1900s when laborers working in farms lived in reduced communities (Martinez et al., 1999:50). However, the development of US colonias is commonly related to the expansion of the manufacturing industry under the Mexico's *maquiladora* program in 1965 (Stutz, 1992:62). The maquiladora or *maquila* was an effort to develop the manufacturing industry in the US-Mexico border. The maquiladoras were part of the Mexican Border

Industrialization Program started after the end of the *Bracero* program.[4] The first colonia type settlements developed in the US were analogous to their counterparts in the Mexico border (Staudt et al., 1998:127). It is likely that Colonias on the US side of the border were developed to attract underpaid workers of the maquila industry who migrated to the US looking for better working and living conditions.[5] In the US, however, the unfamiliar term acquired a life of its own.

2.2 Colonias in the US: The Phenomenon

There are general accounts in the literature about how colonias in the US were originally settled. Scholars point out that colonias existed where there was: a) insufficient supply of low-income housing; b) lack or weak enforcement of land use, building codes and sanitary regulations; c) available suburban land (Ward, 1999:2). Colonias actors involved land developers and low-income groups seeking affordable housing alternatives. Developers worked in association with land owners or owned the land themselves.

> The majority of colonias, however, emerged in the 1950s as land developers and speculators discovered a large market of aspiring home buyers who could not afford homes in cities or access conventional mortgage financing. (Martinez et al., 1999:50)

The initial character of colonias was not illicit. Larson (2005:141) describes it as "extra-legal" as she states that there was no legal prevision that prevented subdividing

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[4] The Mexican Border Industrialization Program was a response to the end of the US *bracero* program of Mexican seasonal workers during the Lindon B. Johnson government (1942 to 1964). The *maquiladora* program sought to attract US manufacturing industries to set up business in the Mexico border by providing fiscal licenses (Mukhija and Monkkonen, 2006:760).

[5] From conversations of the author with Mr. Dickie Haines, a former colonia developer. Laredo, 02/01/07.

and selling un-serviced rural land for residential purposes and codes and standards were not applicable to rural land. In some instances, however, land owners and developers actively supported and funded campaigns of political leaders (Staudt et al., 1998:133) and even formed alliances to influence municipal governments so colonia development was not deterred. Towers (1992) explains how authorities at the county, city and public service levels evaded dealing with the troubles related with the development of colonias in El Paso, Texas for almost two decades. Unequivocally, colonias in the US were developed in peri-urban land in the extra-territorial jurisdiction areas of cities and with no agricultural interest or otherwise economic value.

It is also known that a colonia began by simply subdividing large tracks of land and selling the lots. The land offered did not include on-site services or infrastructure beyond an unpaved access road and, perhaps, the promise of water and sanitation in an undetermined future (Chapa and Eaton, 1997b:3). Lots could be marked with stakes but land was usually not even cleared. The sale was agreed upon using a contract for deed with no or a very low down payment and modest monthly installments until the property was totally paid off. Contracts usually had severe penalties in case of default that included foreclosure and loss of all improvements made on the land (Chapa and Eaton, 1997a:3).

Thereon, colonia development relied mainly on self-built and self-managed housing development and sweat equity (Martinez et al., 1999:58). Since there was no installed infrastructure, services came very slowly if the came at all. Compared to other services, electricity was relatively easy to bring. Shortly after primary housing forms

were built, private electricity companies installed poles, electric lines and meters to lots requesting the service (Staudt et al., 1998:129). Some houses that did not meet regulations to get electric hookups –or could not afford hookups– usually connected to a neighbor's electric systems using extension cords (Chapa and Eaton, 1997c:29). Water provision was more difficult because of the lack of infrastructure. Water was generally hauled by residents from distant locations in trailers adapted with tanks and containers and stored on-site in concrete water tanks or "*pilas*" and big prefabricated fiberglass or plastic bins. Some inhabitants managed to get water from superficial wells near their sites. Wastewater, on the other hand was, at its best, managed with the installation of septic tanks. More often, however, outhouses and toilets discharging in cesspools or just pit latrines were used. These precarious sanitation practices represented a potential risk of contamination of ground water wells and hazard of gastrointestinal diseases and epidemics (Chapa and Eaton, 1997a:43). With some changes in the quality of the water available to residents and the assistance to colonia inhabitants to install septic tanks, this is still the way most colonias get services (Staudt et al., 1998:129).

Land in colonias was mostly destined to residential use. Land adjacent to main roads and highways was usually devoted to small industries and commercial use. These included auto part sales, junkyards, and warehouses behind which, residential lots were developed out of the sight from major transit and roads. Access roads to the colonias were usually located in few, specific points along public roads. Modest unpaved roads and alleys served as access to the residents who were usually the only ones going in and out of colonias. Inside, each colonia was connected by independent networks of streets

and roads. As a result, colonias showed a closed community pattern without necessarily being walled or gated. Their isolation from the public sight explains why colonias went on for many years before their existence and problems were acknowledged.

Housing activity within colonias took many forms. Many residents were aware of the inadequacies of colonias, but they saw buying a lot in a colonias as an investment for the future. Knowing that services would take time to come some purchasers bought their properties literally "to let their investment grow" in time. Families used their land as recreational ranches for weekends and holidays. They would come on weekends and entertain clearing out land and planting small crops and gardens. Some built provisional structures mainly as shaded areas to sit and cook barbecue while there. Others committed a little more and started building rooms or small houses to spend nights while there. The majority, however, relied in moving permanently to colonias as soon as possible. Colonias became the alternative for families who devoted a relevant part of their income to rent housing in cities. For them, a lot in a colonias was an investment that would always revert on the resident while services and standards improved. Moreover, a lot in a colonias was seen as the only way to achieve land ownership and start building equity for households who would not qualify for conventional financial mechanisms.

Some scholars set the beginning of most Texas colonias towards the early 60s (Koerner, 2002:10). In any case, the process of colonias urbanization and development went on as described for several years and by the middle of the 90s, approximately 350,000 inhabitants lived in more than 1,400 colonias in Texas (Office of the Attorney

General 1996). This number rose to 1,600 colonias by the turn of the century (Stuesse and Ward, 2001). The precarious infrastructure of these communities received no improvements and services were never provided, even if offered in contracts. Foreclosures to residents, however, became an imminent threat and, in extreme cases, were executed for missing a single payment (Chapa and Eaton, 1997a:3). Texas law ruled in accordance to written agreements between land owners and colonia residents.

During the late 1980s, the media coverage of cases of households evicted from substandard housing on land deprived of infrastructure in Texas raised awareness of what was saw as "third world" living conditions in the US.[6] The pressing attention drawn by these revelations generated reactions from the Texas Senate and the US Congress. As outcome of this exposure, Texas became the leading experience on colonias and, consequently, Texas legislation on colonias was the model for colonias' federal policies. (Mukhija and Monkkonen, 2006:756). During the last two decades colonias received great coverage and public attention. Legislation was created and funding allocated to tackle the problems associated with colonias. Scholars have researched into colonias' most urgent needs identified, and pubic and private entities have followed legislation designing programs and implementing strategies to overcome colonias' problems and needs.

[6] Press media included the Washington Post, Newsweek and Life. TV programs such as CBS' 60 Minutes presented "The Other America" and the video "The Forgotten Americans" (Galan, 2000; Hill, 2003)

2.3 Defining Colonias in the US

There are almost as many colonia definitions as there are public agencies in the United States involved in colonia assistance. These agencies use 'operative' definitions that allow them to identify the scope of their work within colonias. Unfortunately, as agencies provide their own definitions, they overlook the inconsistencies that sometimes arise in these (Parcher and Humberson, 2007:3).. Ambiguities are also produced by the diverse legal interpretations of what a *colonia* is according to the different statutes that have been created during the last twenty years of US legislation on colonias. Both institutional and legal definitions are generally descriptive and based on the characteristics, location, perceived problems and needs of colonias. Martinez et al. (1999:49) summarizes this view saying that *"border colonias are defined primarily by what they lack, such as safe drinking water, water and wastewater systems, paved streets, and standard mortgage financing."* However, these definitions fall short in contributing to understand colonias comprehensively or differentiate them clearly from similar semi-rural low-income settlements in Texas or other border states. Moreover, many of the characteristics defining colonias regionally and federally describe the better known colonias on Texas (Koerner, 2002:3). This is because Texas has the highest number of these settlements and because that is where colonias came to the public arena (Mukhija and Monkkonen, 2006: 760).

Legislation has played an important role defining colonias. There have been 35 bills passed by the Texas Senate and the Texas House of Representatives between 1987 and 2007. All of them consistently characterize colonias by their rural origin, lack of

water and sanitation, low household incomes and proximity to the US-Mexico border. However, even in the exact definition of each of these items there is great latitude.

According to the Texas Government Code, section 2306.581 (1), colonias are defined as geographic areas in counties with land within 150 miles from the Texas international border that meet the following criteria:

- A majority of low-income and very low-income population as defined by the Federal Office of Management and Budget. [7]
- Qualified as 'economically distressed areas' (areas with median household income 75% or lower than the state's median household income) in which water and wastewater services are insufficient to meet the minimal needs of residents according to the Texas Water Development Board -TWDB- and with no financial resources available to provide services that satisfy these needs.
- It has the physical and economic characteristics of colonias, as defined by the TWDB.

The Texas Water Development Board, on its side, defines colonias as "primarily residential subdivisions" in which:

- water or wastewater services are inadequate to meet the minimal needs of residential users;
- financial resources are inadequate to satisfy minimal water and wastewater service needs; and
- there are five or more housing units. (Water and Wastewater Needs of Colonias: 1995 Update)

[7] The category of very-low income household implies yearly incomes under 50% of the area median. Based on national median family incomes for 1999, this implies an income equal or less than $20.850 (Federal Office of Management and Budget)

Inconsistencies in these institutional definitions soon become evident in the literature. For instance, the Texas Department of Housing and Community Affairs (1993) requires colonias meeting the TWDB criteria to be eligible for community assistance programs. [8] However, to be eligible for education programs addressing land contractual issues, the 150-mile limit increases to 200 miles and includes unincorporated areas smaller than 5,000 inhabitants that could not be rigorously defined as colonias (Guevara, 1999) [9].

Another Texas statute defining beneficiaries of the Colonias Initiatives Program [10] (Section 775.001 (2)) and a Water Code defining colonias (Section 15.001 (12)) keep the qualification of "economically distressed area" given by the TWDB (Section 17.921). However, the geographic limit is reduced to colonias within 50 miles from the border leaving legally defined colonias out of the program.

Even another Texas statute allows that non-border unincorporated areas within 150 miles from the border with inadequate water and wastewater services and household incomes under county averages to be included in the Colonias Initiatives Program (Section 15.001 (12)).

On top of the ambiguities generated by these definitions, colonias that have been incorporated –and consequently could not be considered colonias anymore, remain still eligible for colonia assistance for five years after incorporation if they keep their

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[8] Specifically, the Community Development Block Grant, which is a flexible program that provides resources so communities can address a wide range of development needs (U.S. Department of Housing and Urban Development)

[9] Senate Bill 336 promotes the education of colonia inhabitants in contract-for-deed legal terms.

[10] The Colonias Initiative Program is one of the Texas Secretary of State's programs directed to provide water and wastewater services in the six counties with the highest colonias populations in the most efficient and rapid way (Texas Secretary of State).

qualification as economically distressed areas (Water Code Section 17.921) and household incomes meet Local Government Code Sections 2306.004 (16) and (17).

There have been attempts to clarify the inconsistencies generated by the way colonias are defined. The Texas Office of the Governor provides a more general explanation of colonias categorizing them as "… unincorporated border communities that often lack adequate water and sewer systems, paved roads, and safe, sanitary housing." The Texas Secretary of State tries to provide an inclusive definition of colonias identifying the common criteria provided by government codes and water codes. According to the Texas Office of the Secretary of State colonias are "… unincorporated settlement[s] along the Texas-Mexico border that may lack basic water and sewer systems, electricity, paved roads, and safe and sanitary housing." The definition also adds that most colonias are "outside city limits or in isolated" or "rural areas" of Texas counties and have a "limited property tax base."

The federal government has also maintained vagueness and imprecision in the definition of colonias. The first federal definition of colonias was created in 1990 under the National Affordable Housing Act. Once again, in an attempt to unequivocally define colonias, the act described them as "…identifiable communities in Arizona, California, New Mexico or Texas within 150 miles of the U.S.-Mexico border, lacking decent water and sewage systems and decent housing, and in existence as a colonia before November 28, 1989." Other federal definition by the US General Accounting Office (1990) features colonias of the US-Mexican border as "rural, unincorporated subdivisions along the US-Mexican border in which one or more of the following conditions exist: substandard

housing, inadequate roads and drainage, and substandard or no water and sewer facilities." [11] However, these definitions too often conflict with state practices. For instance, in the border areas of the state of California, settlements that meet the description of federal definitions are called squatter settlements because strict regulations on subdivisions prevent calling them colonias (Pereau, 1993:11).

This section could go on adding definitions by entities at all government levels that would contribute very little to the understanding and clarification of colonias. Most of these definitions are ambiguous in setting the limits of the border region, and are based in physical characteristics, deficiencies, and appearances that are featured also in areas other than the border. Scholars have also pointed out that a Hispanic term with strong geographic, historic and cultural connotations has been used to group together too many disparate phenomena (Mukhija and Monkkonen, 2007). All of this has contributed to misperceptions and misconceptions about the nature of colonias. For instance, the term colonia has been used by public officials and scholars to describe settlements beyond the boundaries legally established for colonias just because they show a predominant Latino composition or similar physical characteristics (Ibid 2007:482). Also, the predominance of low-income Latino communities in the four US-border states has biased the perception of colonias with different demographics. States having colonias with higher proportions of Native Americans and other ethnic groups have been affected by this misperception. Finally, the fact that the region has always been susceptible to illegal immigration from areas with a tradition of unregulated construction

[11] United States General Accounting Office, Report to the Chairman, Committee on Agriculture, House of Representatives, Rural Development: Problems and Progress of Colonia subdivisions Near Mexico Border, GAO: November, 1990, p.1.

in suburban and rural areas has also given a negative connotation to colonias as an illicit housing practice in the US. (Mukhija and Monkkonen, 2006:755; 2007:482).

It is no wonder why it has been a problem for local, regional and federal governments and for agencies and public in general to understand and provide effective assistance to the colonias of the US border. It is very difficult to create one definition that describes the diverse changing conditions in which these settlements with seemingly similar characteristics can be included.

2.4 Texas Legislation and Assistance on Colonias

Legislation has played a main role framing colonias conceptually. Colonias have been at the center of legislative agendas at the regional and federal levels from the late 1980s. From a policy making perspective, legislation on colonias has aimed to address problems attributed to the origin and growth of colonias (Texas House of Representatives, 1999). Identifying the intentions of these policies is an indicator of how colonias are perceived from the public policy perspective.

A complete account of all colonia legislation is included in the Appendix B of this dissertation. A summary of the enacted legislation concerning colonias shows that the objective of Texas legislature on colonias has been threefold. According to the Texas House of Representatives, the most important issue has been to *control health and safety* concerns in colonias by providing water and wastewater services to residents. This was clear in the initial legislation on colonias and the National Affordable Housing Act. The second aim has been to *prevent the creation of new colonias* by enforcing development

standards. This was instrumented by creating the Model Subdivision Rules. The last intention has been to *inform and protect colonias residents* on their rights to homeownership by setting the legal base for colonias sales and purchases. The prioritization of these three intentions is reflected in the chronology of the most relevant legislation on colonias.

Senate Bill 585 by the 70th Texas Legislature was passed in 1987 and authorized the Texas Water Development Board -TWDB- to provide grants and loans for water and wastewater services in *economically distressed areas*. The bill was addressed mainly to raise health standards in colonias. Unfortunately, the bill did not allocate new resources for this purpose and it did not achieve its purpose. [12]

Senate Bill 2 by the 71st Texas Legislature was passed in 1989 to address health and safety concerns and to stop the development of future colonias. Senate Bill 2 had two main components: the inclusion of the existing colonias under the newly created Economically Distresses Area Program -EDAP, managed by the Texas Water Development Board, and the enforcement of compliance to Model Subdivision Rules -MSR, through assistance programs. The Model Subdivision Rules aimed to ensure the provision of water and sewer infrastructure in all new subdivisions with lot sizes of 5 acres or less before lots could be platted. Most importantly, the bill authorized the TWDB to issue $100 million in bonds to fund proposals submitted by cities, counties, and water service agencies to implement projects to supply water and wastewater services to colonias. The EDAP granted assistance to communities with substandard or

[12] Only one loan at 0% interest was funded with this instrument (Texas House of Representatives, 1999).

inexistent water supply and/or waste water systems in counties meeting the conditions of 25% unemployment and income 25% below the Texas average per capita. Eligibility was also restricted to colonias with 80% of occupied lots by September 1989 and compliance with the Model Subdivision Rules. MSR also restricted services to lots with no more than a single-family dwelling whose location within the lots to permit the installation of service infrastructure at a later stage (Chapa and Eaton, 1997c:45).

The Cranston-Gonzalez National Affordable Housing Act (1990) enabled states of the border region to set aside 10% of the Community Development Block Grant (CDBG) to fund colonias' programs. The act was based on the premise that colonias were a direct consequence of their geographic proximity to Mexico as well as its cultural influence and immigration. The act also encouraged the US Department of Agriculture (USDA) and the Environmental Protection Agency (EPA), to direct part of their funds to support programs in colonias.

Senate Bill 336, known as the Colonia Fair Land Sales Act, was passed by the 74th Texas Legislature Session in 1995. The bill was intended to decrease the frequency on colonias' foreclosures. The first component in this direction was to make mandatory that contracts for deed and additional sales documentation were provided in English and Spanish. The second component restricted contract clauses for receding and foreclosing property sales, and permitted the transference of debts from contracts for deed to mortgages when buyers had made 48 monthly installments or paid 40% of the purchasing price of land.

Senate Bill 1421 was passed by the Texas Legislature in 1999 to create an institutional framework in the region to improve water and wastewater infrastructure in colonias. This framework is under the Texas Secretary of State and involves the Director of Colonia Initiatives and one ombudsperson per each of the six counties high highest colonias population (i.e., Hidalgo, El Paso, Starr, Webb, Cameron and Maverick)

Senate Bill 827 was passed by the 79th Texas Legislature in 2005 and is the most recent attempt to improve colonias. The bill created a colonia identification system to track state funded projects in colonias within 62 miles (100 km) from the US-Mexico border. The office of the Texas Secretary of State directed the initiative and a task group was formed including the Department of State health Services, the Health and Human Services Commission, the Office of the Attorney General of Texas, the Office of Rural Community Affairs, the Texas Commission of Environmental Quality, the Texas Department of Housing and Community Affairs, the Texas Department of Transportation, and the Texas Water Development Board. The result of the efforts of this task group is a classification of all Texas colonias according to water and wastewater infrastructure status. The objective is to provide a clear image of the health hazards and risks posed by colonias and to track the progress of state-funded projects benefiting colonias. A report classifying colonias according to the water and wastewater provisions in these colonias has been produced thus far (Parcher and Humberson, 2007: 4).

To this date, legislation and assistance in colonias have provided a relevant service in specific needs. In Texas this has become more evident in the areas of health, sanitation and water supply, community organization, and education. They have been

unable though to comprehensively address the many issues that surround colonias housing.

2.4.1 Regional and Local Assistance on Colonias

The support created by legislation at the federal, state and county level has been canalized by a myriad of public and private agencies and non-governmental organizations providing assistance to colonias during almost two decades. Public and private universities as well as research and educational institutions have been working in increasing the body of knowledge on colonias and contributing to the design, implementation and delivery of some of the assistance provided to colonias. The assistance in colonias has followed public policy, so needs and lacks in water, sanitation, health and education have been their main objective. Many of these entities have also played an important role in identifying the bottlenecks, inconsistencies and contradictions of public policy on colonias.

Because unincorporated colonias are not under the jurisdiction of city governments, counties had to develop capacities and become instrumental in regulating land development, infrastructure and services, and enforcing standards in urbanization, building and sanitation in colonias. Counties have created structures for economic development with substructures for supporting community development, health and education programs, new housing and housing improvement, as well as grant writing to allocate funding for projects in any of these areas. Self-help Centers are one of the arms instrumented to enable and stimulate communities' built-in capacities to improve

colonias. Self-help centers were created by Senate Bill 1509 passed during the 74th Legislature in 1995 to provide support in the areas of technical assistance and funding for waste water, home financing and construction, and legal advice in land property. Self-help centers were established in 2001 in the six counties of Texas with the highest colonias concentration (Cameron/Willacy, Hidalgo, Starr, Val Verde, Webb and El Paso).

2.4.2 The Texas A&M Colonias Program: The Promotoras Model

Created in 1991, the Colonias Program is the main component of the Center for Housing and Urban Development at Texas A&M University. The program is funded with the annual support of the Texas Legislature ($900,000 to $800,000 approximately) leveraged with funds from counties and the federal government, as well as the private sector. The mission of the program was to spur community development in the Texas colonias and to contribute to the identification of needs and delivery of services to their communities. Initially, the Colonias Program engaged in building community resource centers in –CRC– colonias to deliver training and education, as well as health and social services to the people of colonias. One of the more successful programs of the Texas A&M Colonias Program is the *Promotoras Program*. The promotoras are selected members of the colonia communities that have been recruited to link communities with the programs, assistance, and resources available to colonias. Originally, the program attracted mainly female colonia residents members (hence it's name), but in recent years some male members have also joined the teams. Promotor(a)s do outreach work with the

communities making available a variety of external provider systems such as health, mental health, education, employment, training, housing and immigration (May and Contreras, 2007:158). The promotor(a)s experience has been model for entities working in community and capacity building in colonias within Texas and other border states.

2.5 Understanding Colonias: Looking for a Broader Framework

There are two main arguments in the colonias literature that seek to breach through the obstacles to broadly and comprehensively understand colonias. The first of them have sought to bring colonias beyond the local problem-oriented perspective provided by policy. The second has tried to set colonias into the larger context of phenomena in similar rapidly developing areas in the US and the world. These arguments and here discussed.

2.5.1 Beyond the Policy Perspective

Because local, regional and federal policy efforts to isolate and reduce colonias had framed the way colonias in the US are understood and perceived, the phenomenon still shows aspects insufficiently assessed and unknown. Critics to colonia policies argue that the excessive attention to colonias' health and safety and the prevention of colonia expansion has diverted attention from the more important issue of the shortage of conventional low-income housing alternatives for colonia inhabitants, which is what caused colonias to begin with (Davies and Holz, 1992; Ward, 1999). The implicit consequence of these statements is that, despite all efforts, colonias are likely to prevail

because no conventional housing will be able to offer a competitive affordable alternative to the poor (Chapa and Eaton, 1997a:5). Consequently, understanding the housing processes that operate in colonias can provide relevant information to seek alternatives to improve the living conditions of colonia residents.

One of the persistent characteristics of colonias that can help us to understand them better concerns to their status of "unincorporated settlements." Studies by Pereau support this view as she describes colonias as *"housing settlements, in many ways not unlike standard subdivisions that have grown up outside the legal limits of urban areas all along the U.S/Mexico border."* (Pereau, 1993:10). That is, one of the features that make colonias clearly unique as subdivisions is their extralegal condition given mainly by their location out of urban boundaries. As subdivisions in rural land, access to basic infrastructure, services, transportation, jobs, education, health, and other facilities and amenities are very limited. Thus, many of the characteristics used in definitions to describe colonias are consequences of their exclusion of urban areas. Depictions of colonias as environments with improvised, temporary, and in general low forms of housing, lacking basic infrastructure (water supply, water disposal, and electricity), and unpaved streets come attached to the unincorporated condition of their land.

This cause-effect relationship questions the efficacy of the symptomatic approach that policy has had to colonias. The experience is that, in spite of the progress that colonias have experimented during the last decades, policy based assistance in colonias have fell short of expectations. Colonias are likely to continue with their problems as long as the structural problems that originated them are not addressed. In fact, the short

history of colonias in the US already shows evidence of more complex consequences of colonias' initial exclusion of urban land and their development. City governments are reluctant to annex colonias because there is uncertainty of the ability of colonias to generate the tax base to support the cost of installing infrastructure to provide services. Colonias that were once located out of the city limits have been engulfed by urban growth but remained as isolated areas within the expanded urban fabric (Ward, 2001). Several colonias in the southern Laredo area in Webb County are examples of this problem.

There are also misconceptions about colonias that have been proven wrong. For instance, colonias have been portrayed as inhabited by illegal unskilled rural immigrants with no stable jobs and low or no education. However, even though Mexican migrants are attracted to live in colonias, over 85% of colonias inhabitants are American citizens (Chapa and Eaton, 1997a:38). Hispanic Americans is the largest group of colonias inhabitants, but white Anglo Americans as well as Native Americans are also included (Ward, 2000). Pereau also finds unskilled as well as semiskilled workers in colonias, but holding jobs for very long periods of time. She shows that older generations of residents (naturalized immigrants) have low or no education, but generations born in colonias have higher education levels (Pereau, 1993:27).

2.5.2 Beyond the Local and Regional Perspective

The other argument includes colonias into a larger framework of extralegal settlements in the US and even within the context of other developing countries. This perspective, initially inspired by the similar characteristics between colonias of US and Mexico, sustains that the phenomenon observed in colonias transcends regional boundaries to analog situations in low-income housing of less developed countries (Holz and Davies, 2003). The origin of this view lays on the seminal work by early scholars in colonias contrasting these settlements in twin US and Mexican cities along the border (Ward, 1999). The previous work of Ward in Mexico (Ward, 1982) led him to recognize commonalities in the patterns of origin and development between the Texas colonias and informal settlements in the urban peripheries of Mexico City. Ward (1999:65) identified that an unsatisfied demand for low-income housing, a large supply of idle or unproductive low-cost peri-urban land, and a relatively weak enforcement of urbanization and building codes, standards and regulations facilitated the development of colonias in both sides of the border.

Among some scholars, this idea has further evolved into the insertion of colonias into new classifications for this kind of extra legal settlement in the US (Donelson and Holguin, 2001; Harris, 2001; Ward, 2001; Ward and Peters, 2007; Koerner, 2002). Harris includes colonias among North American irregular settlements. He defines these as settlements located beyond urban fringes "where land was cheap [and] settlements were hidden from the public view" developed in the US and Canada as early as the beginning of the 20th century (Harris, 2001:13). Irregular settlements of this kind were

common in small and mid size urban centers such as Peoria in Illinois, Flint in Michigan, and Modesto in California (Ibid). But they could also be found in the outskirts of big cities such as South Central Los Angeles, north of Detroit, south and southwest of Chicago, and north and northeast of Toronto (Ibid). These settlements were promoted by land subdividers as a cheaper alternative than land furnished with rigid building regulations in exclusive neighborhoods of cities. Unregulated settlements were very common all throughout the first half the century until the rise of suburbia, when these settlements ended up being pushed well beyond peri-urban areas.

Most recently, Ward (2001) branded the term Quasy-Formal Homestead Subdivisions –QFHS– to incorporate colonias into this larger class of self-produced settlements that are more common in the US than originally acknowledged. Ward identifies the roots for QFHS as economical and associated to the functioning and performance of land markets (Ward et al., 2004). In the case of Texas Colonias, his research shows that poor land market performance is produced by:

a) Factors inhibiting land sales and/or land occupancy reflected in the high absentee lot ownership seen in colonias (from 15% to 30% of vacant lots). The Texas Water Development Board shows an average of 30% of unoccupied lots for 1381 colonias by the 1990s. Ward points out that by and large lots in Texas Colonias have been sold through (Ward and Carew, 2000), but legislation is preventing resale due to lack of infrastructure and services.

b) Low revalorization of land in colonias due to low investment-vs.-return rates. While buying in colonias has been probably one of the very few investments than

the poor could made, equity of colonia land and any added value in housing is far from reaching returns of other land and similar market investments (Ward el al., 2004:31). That itself may be inhibiting land sales of absentee lot owners who see no profit in selling even if they are not planning to occupy the land.

2.6 Colonias from a Global Perspective

In many ways, colonias are part of the phenomenon of the informal development process that is observed in developing areas. US colonias, North American irregular settlements, and informal settlements in developing countries are included in what Castillo calls the "phenomenon of informality," as he claims that informality is not a homogeneous phenomenon but "one of diverse and complex natures" (Castillo 2000:3). The concept of informality entails a simple idea: that these arrangements occur out of the formal planning framework of cities, regions, and countries. Even if this definition includes too many and disparate things, colonias belong in this category. It is this informal condition of colonias and the fact that they concentrate low-income communities what makes them similar to other low-income informal settlements. However, there is more to the idea of informal settlements than just being out of the formal planning framework. The literature shows common aspects that characterize informal settlements and colonias have in many of them. Larson points this out in the specific case of US colonias:

> Notably, the ways in which the colonias are nonconforming inside the United States are also the ways in which these settlements share the characteristics of informal housing settlements throughout the world. Thus colonias are not an ad hoc peculiarity of our borderlands, but rather a patterned alternative to what the United States knows as the "normal" practices of housing development (Larson, 2005:145).

Whether in the context of a developed or a developing country, a process that develops out of the formal mechanisms of planning is showing the *weaknesses of planning institutions* that regulate development. In developing countries, planning has been unable to control and regulate the activities of private developers and individual inhabitants in colonias. But planning has also unable to provide appropriate, timely and sufficient responses to the housing needs of lower income sectors of the population to begin with. Informal settlements in developing countries are usually an escape valve for the urging and increasing housing needs of low-income population that weak planning institutions are unable to satisfy. Ironically, the rapid development and growth of informal settlements increase pressures on these planning institutions to satisfy the needs for these new areas. It becomes a cyclic process in which what contributes to informal growth is affected by the consequences of unplanned growth. In colonias too, people seek for housing in these settlements because they consider them a better option than other alternatives available within the planning framework of cities. At the same time, colonias impose a demand on infrastructure, services, and facilities that no planning framework was able to provide when needed.

Colonias as well as other informal settlements *mobilize relevant economic resources* in their local economy. Residents of informal settlements are consumers of goods and services in the formal sector as well as in informal networks developed with private entrepreneurship. The access to formal economy may be limited by the nature of informal settlements. Sometimes the peri-urban location of the settlement or just the limited economic resources of these communities force them to seek alternative ways to

obtain goods and services needed. As informal settlements in other areas, colonias mobilize financial resources even in sectors of the formal economy. For instance, construction workers and contractors are hired by households to work in colonias. Dealers of used trailers and manufactured homes have an important market in colonia residents (Ward, 1999:102). Residents of colonias are also consumers of diverse materials for the construction of their homes. These include class II and class III quality products (with small defects that do not classify as class I in quality inspections) and recycled construction materials (information obtained from an interview with the director of the Webb County Self-Help Center). Colonias also use new or used materials intended for purposes other than construction (corrugated cardboard, plastic sheets, scrap wood and metal, etc.). For instance, discarded shipping palettes are seen fencing lots and recycled corrugated metal sheets are used for roofing and siding. Materials collected from demolition sites are cleaned and sold for colonia homebuilding. Discarded metal drums and plastic containers, used doors and windows, bathroom fixtures, appliances, leftover studs and structural steel are part of the homebuilding repertoire of colonias (interview with the self-help center director). None of these practices is exclusive to colonias. Markets of secondary building materials have been reported for other informal settlements. Markets of recycled materials existed to build housing in the barrios of Santo Domingo in the Dominican Republic (Rosario, 1992). Similarly, services such as water have been privately assumed in informal settlements in developing countries. Cistern trucks selling water brought from remote locations filled household's tanks and containers in the barrios of Bogota (Ortega, 1992). In colonias, portable privies (the type

used for public events) can be seen in lots with no septic tanks. Informal settlements are a relevant and attractive sector of the local economies.

However, the most outstanding characteristic that colonias share with their counterparts of the developing world is the *dynamic process of continuous individual changes* that generates its housing diversity. Also known as incremental or progressive development, this is the process by which primary shelter structures consolidate in time into sounder and permanent house forms (Turner, 1970:1; Laquian, 1983a:54). The main characteristic of progressive development is that it is user-managed and user-responsive, thus housing is transformed responding to the household's evolving characteristics and needs (Reimers, 1992:1). As a consequence of this process, colonias offer the widest housing diversity. House forms range from the temporary shack built with discarded materials, or the second hand trailer that can be sold or transported to other locations, to the sound dwelling built with permanent construction materials and its eventual additional separate structures. Households include the single-or extended family that may also include descendents and relatives, to the renters of a detached structure or a room in an existing household (Turner, 1968:158). Once again, the "extralegal" condition of Colonias allows for housing forms and households that are not found under the regulated environments of the formal city. This diversity has in several ways satisfied the demand of different kinds of low-income households that wouldn't otherwise find housing alternatives within the city.

2.7 Housing in Colonias and the Issue of Standards

Beyond these broad ideas that relate to colonias, not much has been written about colonias housing. Ward already acknowledged this lack of information in the late 90s. He argued that, in contrast, there was a wealth of knowledge on informal housing in developing countries that shared commonalities with US colonias (Ward, 1999:65). According to this knowledge, much like colonias, informal housing in the developing world was produced by the inability of the public and private (formal) sectors to absorb the housing demand of low-waged unskilled workers attracted to urban areas by rapid urbanization and economic development (Ibid :66). This limited capacity triggered the construction of housing through self-help means in illegally occupied peripheral land that became known as settlements of squatters or shantytowns.

Colonias, like low-income settlements in the developing world, are an affordable alternative to the poor because they do not carry attached the cost that urbanization and infrastructure imposes on land prices. Thus, making residential land and housing affordable consistently involves lower standards that any higher cost housing (Graham and Pereau, 1994:140). It is the nature of the process observed in informal housing that these initially lower conditions of housing, infrastructure and services will develop together as the inhabitants improve their housing and it is not relevantly different in colonias.

> In the Texas colonias… the self-build nature of construction means that housing often does not meet building codes initially but over time individual investment may improve the structure such that it eventually meets various standards. (Koerner, 2002:15)

On the other hand, the objective of standards, codes and regulations is undisputable: to ensure a level of safety and well-being for the individual, the community and their property values (Payne and Majale, 2004:24). Thus, the problem of standards in low-income housing has always revolved around determining the difference between what is demanded by codes and regulations, and what is acceptable to ensure the basic purposes of standards (Turner, 1972:148). In the US, this problem is aggravated because for many years codes and standards have gone hand in hand with a steady increase in the quality of life and income of individuals. Scholars even raise the question of how much of the low-income housing shortage in the US is actually "created" by unrealistic high standards in this always increasing process (Baer, 1977).

The issue with standards becomes then to determine the point between what low-income people can afford and what is required by codes and regulations that households can afford. In colonias the distance between what is actually built and what is required is greater than in the US.

In the global arena, alternatives to high standards have explored the ideas of minimum acceptable standards, temporary standards, and performance standards (Turner, 1970:151). Minimum standards basically deal with the idea of defining standards that ensure survival just above risk levels. Temporary standards are usually limited to specifics areas and/or periods of development of the settlement. Performance standards deal with the idea of specifying the "basic safety and performance requirements" leaving a range of possible options to meet them (Graham and Pereau, 1992:140). However, a series of relatively successful international experiences is not enough to change the idea that

enforcing any set of requirements different from official standards would be unacceptable when it comes to issues such as health and safety (Laquian, 1983a:73).

In an ultimate effort to enforce standards, legislation required compliance with building and safety codes and regulations to have access to assistance in colonias under EDAP (Chapa and Eaton, 1998c:2). Meeting urbanization standards such as housing setbacks and prohibitions to build in certain areas, building codes, water and wastewater codes and other regulations are mandatory to register a lot in a colonia and to gain access to metropolitan services. Texas regulations prevent service provision when residents and dwellings do not comply with setbacks, housing codes, floodplain requirements, or city-county health regulations. Infrastructure building codes under the Model Subdivision Rules were adopted in 1989 by legislature making mandatory that lots under 5 acres were platted by the county (Ibid). MSR also restricted lots to contain one single family-dwelling. Regulations in Texas also govern the type of infrastructure which can be provided, thus limiting the alternatives that can be offered by service providers" (Ward, 1999:137).

> In the arena of housing… … existing models of land development and housing quality regulation establish unattainable standards that hinder the poor in their effort to provide for basic shelter. The other side of the regulatory coin (deregulation) might tolerate but does not legitimate the informal sector, and abandons any aspiration to improve conditions for this sector over time. (Larson, 2005:142)

The unsolved issue of standards in colonias is a no-win situation. Strict and sometimes excessive demands and regulations prevent the poor segments of the society to obtain access to benefits available to other segments of the society. However,

flexibility with standards or a double set of requirements makes it much harder for the poor to aspire to the benefits that should be available to all. Is a downward spiral in which urbanization and building regulations and codes that are meant to ensure the health, safety, and the well-being of the community may end up pushing further down the poor and making it even more difficult to reach up to acceptable living conditions.

2.8 Consolidation and Progressive Development in Housing

The term "progressive development" (Turner, 1972:131) includes a variety of approaches that rely on user participation in the housing process. Squatter, irregular or informal settlements and their upgrading mechanisms, strategies of basic housing (such as shell housing and site and services schemes) and other phased housing developments are included within their scope (Laquian, 1983a; 1983b).

Progressive development "is the process by which initially very basic and even precarious forms of shelter eventually become lasting, durable housing" (Reimers, 1992:1). The main characteristic of progressive development is that it is user-managed and user-responsive, thus "housing is continuously tailored to the household's changing characteristics and needs" (Ibid).

As housing strategy, progressive development became a component of housing projects for low-income groups since 1940 with different characteristics and applied and diverse scales (Brennan, 86:1993). Banerjee and Verma (1994:263) reported that several local governments in India promoted the layout of lots without services that were assigned to low-income families. The "minimum urbanization program" in Colombia

allotted 12,000 lots providing only roads and common water taps in the early 1960s (Peattie, 1982:133; Caminos and Goethert, 1978:28). In Chile basic urbanizations of demarcated lots were provided under what was known as *Operación Sitio* (Operation Site) (Kusnetzoff, 1975: 50) [13].

Attention to progressive development as a housing strategy followed the work of scholars such as Charles Abrams (1964),[14] William Mangin and John Turner (1968),[15] and Elizabeth and Anthony Leeds (1972)[16] on informal settlements in the developing world. Laquian pointed this out when he referred to self-help basic housing strategies:

> The pioneering studies of Abrams, Turner, the Leeds, Mangin, and others chronicled the ways in which the urban poor provided themselves with sites, shelter, and services. The ideas of mutual aid, self-help, community action, core housing, and progressive development were derived from the actual practices of squatters and slum dwellers. (Laquian, 1983a:7)

Observations of incremental housing in squatter settlements were fundamental to challenge the excessive attention that housing programs gave to the aesthetic image of the projects. Incremental housing re-defined low-income housing as a process in which the sequence of house forms was rather a response to the characteristics, priorities and needs of the household (Reimers, 2002). Turner (1972:148) branded this new vision with his famous statement of "housing as a verb," based on his reflections about his previous work in Lima.

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[13] Kusnetzoff, Fernando 1990. "The State and Housing in Chile-Regime Types and Policy Choices." In: Housing Policy in Developed Countries by Gil Shidlo. London: Routledge.

[14] Abrams, Charles; 1964 "Man's Struggle for Shelter in an Urbanized World" Cambridge, Massachusetts: MIT Press.

[15] Turner, John and William Mangin; 1968. "The Barriada Movement" in Progressive Architecture Vol. 49, May. pp 154-62.

[16] Leeds, Anthony and Elizabeth Leeds "Brazil and the Myth of Urban Rurality: Urban Experience, Work and Values in the 'Squatments' of Rio de Janeiro in City and Country in the Third World: Issues in the Modernization of Latin America, edited by Arthur Field, Schekman Publishing Co., Cambridge, MA.

> The classic sequence of housing locations, from the shared room of the young man or very young family to a rented tenement room of the young family, to the progressively developing settlement needed by the growing family reflects a logical sequence of responses to changing needs within the limits of the growing family's means (Mangin and Turner, 1968:158).

However, housing was more than the simple manifestation of household's characteristics, priorities and needs. Housing in informal settlement permitted poor households to improve their living conditions by developing activities that helped to their survival. A small crop or raising chickens in the backyard, renting a room or setting a small stall, shop or store to sell merchandise or even a workshop to do small jobs permitted households to generate an income that could significantly add to their living.

> The possessor of an urban homestead, even if it is not more than a shack on a plot of unserviced land, can rent a part or can use it as a shop or a workshop. The savings will, in general, be invested in the construction by stages of a dwelling with modern standards.... After the ten or fifteen years necessary for the completion of the first unit of their dwelling have elapsed, the average family has a higher priority for modern amenities and lower priorities for permanent tenure.... More important at this later stage will be the social status given by the quality of the dwelling environment and the social security given by its equity rather than by the inalienability of its tenure. (Caminos, Turner and Steffian, 1969:vii)[17].

The observation of these experiences contributed to the promotion of progressive development as a strategy to be included low-income housing projects. In this way, progressive development became associated to a wide range of projects that also incorporated concepts such as user involvement and community participation, self-assisted, self-build and self-help/self-management of housing production that became widely implemented by international and local funding agencies during the 70s and 80s.

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[17] Caminos, H., J. Turner and J. Steffian 1969. "Urban Dwelling Environments." Cambridge, MA, The MIT Press.

2.9 Previous Research on Housing Diversity and Consolidation in US Colonias

Within the body of research on colonias, diversity of the housing produced in these settlements is never addressed directly (Madsen, 1964; Graham and Pereau, 1992; Pereau, 1993; Ward, 1999). Reports on specific characteristics of colonias' housing are general, vague and often lack information on how this housing diversity is generated. The literature describes housing in colonias as an on-going process or "a work-in-progress" (Mukherji, 2001: 9). However, no longitudinal studies exist that allow identifying how the house forms in the early stages of colonias housing develop in time into durable residential structures.

Observations of a cross-section of colonias' housing shows diverse self-managed housing types interlaced with a variety of conventionally produced housing such as new or reused ready-built and manufactured housing and trailers. One study of 261 dwellings in 14 colonias of Texas shows the presence of 3% of shacks or campers, 16% of trailers, 64% of self-managed consolidated houses, and a 20% of dwellings that combined two or more of the previous house forms (Ward, 2001: 71). Diversity is also implicit in the different stages of development of the temporary and unfinished self-help structures that coexist with more completed and consolidated houses some of which have already started to be extended over (see figures 7, 8 and 9). Another study in three major colonias of Texas shows a diverse composition of temporary shacks (5%), trailers or buses (15%), wood-frame houses in poor condition (20%) and good condition (45%), and masonry constructions of brick or cement blocks (15%) (Davies and Holz, 1992: 125).

Figure 7. Diversity of house form types and stages of development. Even in the same lot diversity can be seen in the multiple structures of this compound shared by six directly related households that includes campers, manufactured houses, permanent structures built on site, second story, attached and detached additions in different stages of development (Tanquecitos II, Webb County-TX 2007)

Figure 8. House form built incrementally over time. The original permanent structure on this house form has been increased in several stages by attaching additions to the rear and a large porch to the front (Tanquecitos II, Webb County-TX 2007)

Figure 9. Housing compound of structures built incrementally. Structures belong to several related households (brothers) and have been built by progressive development over time (Tanquecitos II, Webb County-TX 2007)

Figure 10. Remote colonias show similar housing patterns. The left image shows the entrance to Pueblo Nuevo, a colonia 8 miles away from the limits of Laredo. The right image shows several campers in one lot (Pueblo Nuevo, Webb County-TX 2007)

Figure 11. House forms are added over to accommodate household changes. The image on the left side shows that the initial trailer has been added a permanent structure towards the front. The right image shows a sequence of three structures attached to each other (Pueblo Nuevo, Webb County-TX 2007)

Figure 12. House forms reflect the household(s) characteristics. The image on the left shows an initial trailer with an added porch on the left side and a second structure built in the background to accommodate a second household. The image on the right shows a compound of housing structures that house three related households (Pueblo Nuevo, Webb County-TX 2007)

As with other developing countries, most of the research in colonias has given priority to problems that seem more important because they involve pressing concerns and even risk for the inhabitants of the colonias and the communities in which they are inserted (Koerner, 2002:1; Guevara, 1999:2). Issues of health, mainly due to lack of adequate water and sanitation, deficiency of infrastructure and services such as paved roads and transportation, and medical, educational, or recreational facilities, have attracted the attention of researchers for many years (ibid). Legal matters such as land regularization, tenure, and acquisition have also taken a lot of the attention from public and private entities (Ward et al., 2003).[18]

Housing, on the other hand, has taken on the form of inhabitants' needs as they demonstrate their ability to take care of this need through their own means. The philosophy of research and assistance directed to colonias has been to provide for the larger issues that seem to affect the majority of the inhabitants and that seem more difficult to accomplish (such as health care or legal tenure), and let individual or household processes (such as housing) to unfold (see figures 10, 11 and 12).

2.10 How All This Adds Up

This research focuses on housing diversity and the process by which housing is produced precisely because it is a highly individualized phenomenon with a positive outcome. The priority that households give to the completion of their housing is a clear

[18] The largest effort was made in a program by the Community Research Group in the Lower Rio Grande in which 15 colonias were targeted to clear land titles and regularize tenure aiming to stimulate land and housing markets (Ward et al., 2003 "Final Report of the CRG Colonia Lot Titling Program in Rio Grande City, Starr County, Texas" LBJ School of Public Affairs, Austin, TX).

indication of the issues that are of most importance for low-income inhabitants. The way housing is built and diversified reflects the different characteristics and diverse nature of needs of households in colonias that in much opposes conventional standardized low-income housing approaches. In addition, recent research in colonias has also turned public attention back to the process of housing production and consolidation because it is one of the most important factors raising the value of land and housing, and providing equity to households. A study on the impact of land regularization found that land titling and regularization showed "little or no influence upon [land and housing] market performance." However, the study suggests that housing production and improvement is the factor raising property value in colonias (Ward et al., 2004: 2641). This is a very important finding that acknowledges the relevance of the diversity of housing opportunities and the process by which housing develops in colonias. The study of the dynamics of households and house form is key to understand colonias housing.

3. PROBLEM

This section identifies relationships between the limited success of housing assistance and housing programs in the colonias of Texas and the need to understand better the mechanisms and the process by which housing is produced in the colonias. The section also delineates the specific objectives of the study and the questions that guide the research.

3.1 Problem Statement

The benefits of progressive development in low-income housing and the process described in the previous section have been continuously acknowledged by researchers and scholars in colonias (Davies and Holz, 1992; Ward, 2001). But the nature of this process is overlooked by the housing and planning institutions and policies that seek to contribute to colonias' physical development. Current assistance programs give priority to land regularization and upgrading of colonias.[19] These efforts to "improve" colonias tacitly promote a simple model of detached, single-family houses that characterizes suburban housing production in the United States. This model strongly contrasts with the reality of colonias in which a markedly heterogeneous environment of diverse house form expressions provides shelter to a variety of household types that stretch the limits of the idealized nuclear American family. Colonia inhabitants live sometimes in less typical households often in one or more incomplete housing structures built on

[19] Regularization consists in providing legal land titles to land occupants in order to ensure their legal permanence in self-developed land. Upgrading usually refers to the provision of urban services and infrastructure on these already-built settlements (Laquian, 1983).

unincorporated land that do not comply with building regulations, standards or codes for housing. Lots with incomplete or multiple housing structures inhabited by more than a single-family household often do not qualify for service connections or benefit from housing improvement programs. The consequence is that these programs have a very limited impact on colonias. By turn, inhabitants of colonias end up marginalized from the formal institutional framework of planning and development. In open contradiction with their initial intentions, the requirements of housing assistance programs and the enforcement of development standards through their implementation produce the undesired effect of preventing the improvement of the colonias.

Attempts that have been made to ease and make flexible development standards in colonias have been very limited in scope and success and they are opposed by regulatory agencies. The possibility of lowering standards for colonias housing, even temporarily, has been discredited because the idea of promoting a double set of standards seems objectionable to planning authorities. Alternatives to rigid standards, such as performance standards, have never been accepted by local governments and planning authorities who fear they would be liable for the safety and health of communities (Koerner, 2002:6; Guevara, 1999:8). Adding to the resistance are studies of flexible standards in places other than colonias that have shown the limitations of the inhabitant's abilities to be involved in all the aspects of development of their communities.[20]

[20] Studies on self-built environments in developing areas show how construction and settlement layouts can prevent spatial or infrastructure improvements without considerable demolition and expropriations (Alexander, 1977; Aristazabal and Gomez, 2001).

While the efforts to change the living conditions of the poor in colonias seem to have reached a dead end street, the theoretical frameworks in which housing in colonias occur remain relatively unexplored (Laquian, 1983). The functions that designers, architects, and planners can perform in this context remain uncertain and unclear (Hamdi, 1991). This poses new challenges for the design and planning disciplines on which the built form and environment cannot be predicted or managed with the conventional tools and practices of architects and planners.

3.2 Research Objectives

This research identifies, documents, and analyzes the characteristics of housing diversity in colonias and the way this diversity changes and consolidates over time. Two dimensions of housing diversity are considered: *house form* and *household arrangements*. House form involves the physical characteristics of the housing structures used by households and the successive changes made to these structures over time. Household arrangement involves the composition and characteristics of the resident group and its changes over time. The study also investigates relationships between house form and household arrangement in the colonias. These relationships have been highlighted by early housing researchers in low-income informal settlements since the 1960s (Mangin and Turner, 1968: 158; Caminos, Turner and Steffian, 1969: vii).

In colonias, recent research has identified the need to more fully explore the relationships between housing and households to achieve a "better understanding [of]

how housing and household dynamics are intertwined" (Ward, 2001:73; 2004:2641). [21] This information is critical to understand and contribute to the process by which housing is generated in the colonias, and to inform housing design, policy, and programs supporting colonias in their different stages of development.

This study hypothesizes that, in maintaining these relationships, house form and households go through a process of change that leads to the consolidation of initially simple and even temporary forms of shelter into sound and lasting housing. The overall settlement could be improved in this way up to what can be considered conventional urban standards (Graham and Pereau, 1992; Davies and Holz, 1992; Ward, 1999). Consequently, any attempt to provide support and assistance to low-income housing in the colonias must consider understanding this process in their conceptual frameworks.

The main objectives of the research are:

- To identify, document and analyze the overall housing diversity of selected colonias of South Texas in two dimensions: *house form* and *household arrangements*.
- To differentiate categories of house form in selected colonias and, if present, identify patterns of house form composition, as well as patterns of change over time of the colonia.
- To document different types of household arrangements in colonias and to identify possible patterns of household characteristics and composition in selected colonias, as well as changing trends in household arrangements over different times of the colonia.

[21] Ward, (2001) identifies the need for a "better understanding of how housing and household dynamics are intertwined".

- To identify the relationships between house form and household arrangements, and the way these relationships change and generate diversity over time.

In addition, this study will explore and discuss how the outcome of this research could inform housing policy at the different local, regional, and federal levels. The research will also seek avenues to incorporate this knowledge in ongoing public and private efforts directed to improve housing in colonias.

The research was conducted in a group of selected colonias in Webb County, near the US-Mexico border in Texas, one of the regional locations of the Colonias Program of Texas A&M University. For nearly fifteen years the A&M Colonias Program has developed and implemented projects addressing health, education, and quality of life in the colonias of Texas. The established presence and relationships of the A&M Colonias Program within the colonias communities and the Alta Vista Community Center of Webb County are relevant for the successful collection of reliable field data for this research. In turn, the study aims to be influential in the design of future programs for housing improvement and consolidation as well as similar efforts intended to improve the quality of colonias housing.

3.3 Research Questions

This research addresses several main questions pertaining to colonias' house form and household characteristics. Seeking to understand house form patterns from simpler and even temporary, to more permanent and complex structures (i.e., what

happens first and what comes in subsequent stages of development), the main research questions are:

- What are the characteristics of house form in colonias and how does house form change over time?
- Are there identifiable types of housing produced in colonias at specific times of their development?

Looking at changing patterns of formation of households (i.e., who settles initially, who moves in and out later, who is born into the household, who stays temporarily, etc.), the questions are:

- What are the household characteristics and arrangements that can be found in colonias housing?
- Do household characteristics change over time? If so, are there recognizable patterns of household change over time?

Examining the dynamics between house form and household (i.e., how household characteristics and changing patterns affect the development of the house form), the question is:

- What, if any, are the relationships between household and house form?

Among other issues deriving from answers to these questions that this research discusses are looking at ways in which housing consolidation influences property value in colonias, and exploring avenues to incorporate the knowledge derived from this research into the design and development of policies and strategies to improve housing, services, and infrastructure in colonias.

4. METHODOLOGY

This section discusses the methodology used to collect and analyze data for the research. Presented here are descriptions of the criteria used to select the sample of colonias, preliminary analyses made to approach the study, the data collection design and preparation for fieldwork, and an account of the interviewing process. The section ends with a summary description of the characteristics of each of the colonias surveyed.

4.1 The Sample

The case studies included colonias of varied ages and types that met the criteria of: available periodic aerial records, household census information, field work support, and accessibility to the colonia (Denzin and Lincoln, 2000: 370).

The colonias selected were located along the north side of highway 359 east of the city of Laredo in Webb County, Texas (see figure 13). The selected colonias were between 15 and 35+ years of age and represented heterogeneous characteristics of several colonia types. In order to have demographic information of the sample, one important selection criterion used in selecting these specific colonias was that their geographic boundaries matched very closely the block definition used for the 2000 census. A second important criterion was availability of aerial or satellite imagery of these settlements from different years throughout their development. According to the US Census Bureau and the Attorney General of Texas, the group of colonias selected included (from west to east) Larga Vista, Los Altos, Tanquecitos South Acres, San

Carlos #1 (also known as San Enrique), San Carlos #2, Ranchitos 359 East, Ranchettes, Las Blancas Subdivision, Pueblo Nuevo and La Coma. These colonias were also served by and located close to the Webb County Self-Help Center [22], and the Larga Vista Community Center in which the Texas A&M Colonias Program has personnel on a permanent basis working on different projects. Additionally, the Texas A&M Colonias Programs Regional Office in Laredo had -until recently- been at a location nearby and their personnel have previously worked in these colonias in several opportunities. All these considerations were key in facilitating access to the inhabitants of this group of colonias. Table I summarizes characteristics of the selected colonias.

Table I. Characteristics of selected colonias.

	Extension (acres)	Year Recorded (19__)	Population (# of residents)	Lots	Lots Occupied	Inhabitants / Lots Occupied	Population with water	Population without water	Populat. with wastewater	Pop. without wastewater	Electricity connection	Paved roads
Larga Vista	36	----	544	140	126	4.32	544	0	544	0	yes	yes
Los Altos	53	85	474	96	81	5.85	0	474	0	474	yes	no
Tanquecitos S.Acres	303	87	404	95	59	6.85	0	404	0	404	yes	no
San Carlos #1	82	85	345	98	66	5.23	0	345	0	345	yes	no
San Carlos #2	45	85	249	62	44	5.66	0	249	0	249	yes	no
Ranchitos 359 East	37	85	215	56	45	4.78	0	215	0	215	yes	no
Las Blancas Subd.	587	91	13	----	----	----	----	----	----	----	yes	no
Ranchettes	442	73	85	26	8	10.6	0	85	0	85	yes	no
Pueblo Nuevo	369	86	603	291	129	4.67	24	579	24	579	yes	no
La Coma	777	71	96	39	21	4.57	----	----	----	----	yes	no

Source: Attorney General of Texas website http://maps.oag.state.tx.us/colgeog/

[22] Under Senate Bill 1509 approved by the 74th Legislature, self-help centers –SHC- were established in 5 counties with the largest number for colonias. Each SHC was experimentally concentrated in providing assistance to 5 colonias of the county. The Webb County SHC officially serves Los Altos, Tanquecitos I and Tanquecitos II, San Carlos I and San Carlos II and D5 Acres. However, other neighboring colonias also benefit from the assistance provided through its tool lending library, model house plans, technical assistance, home improvement and construction classes, public services and solid-waste clean-up campaigns, program outreach, etc.

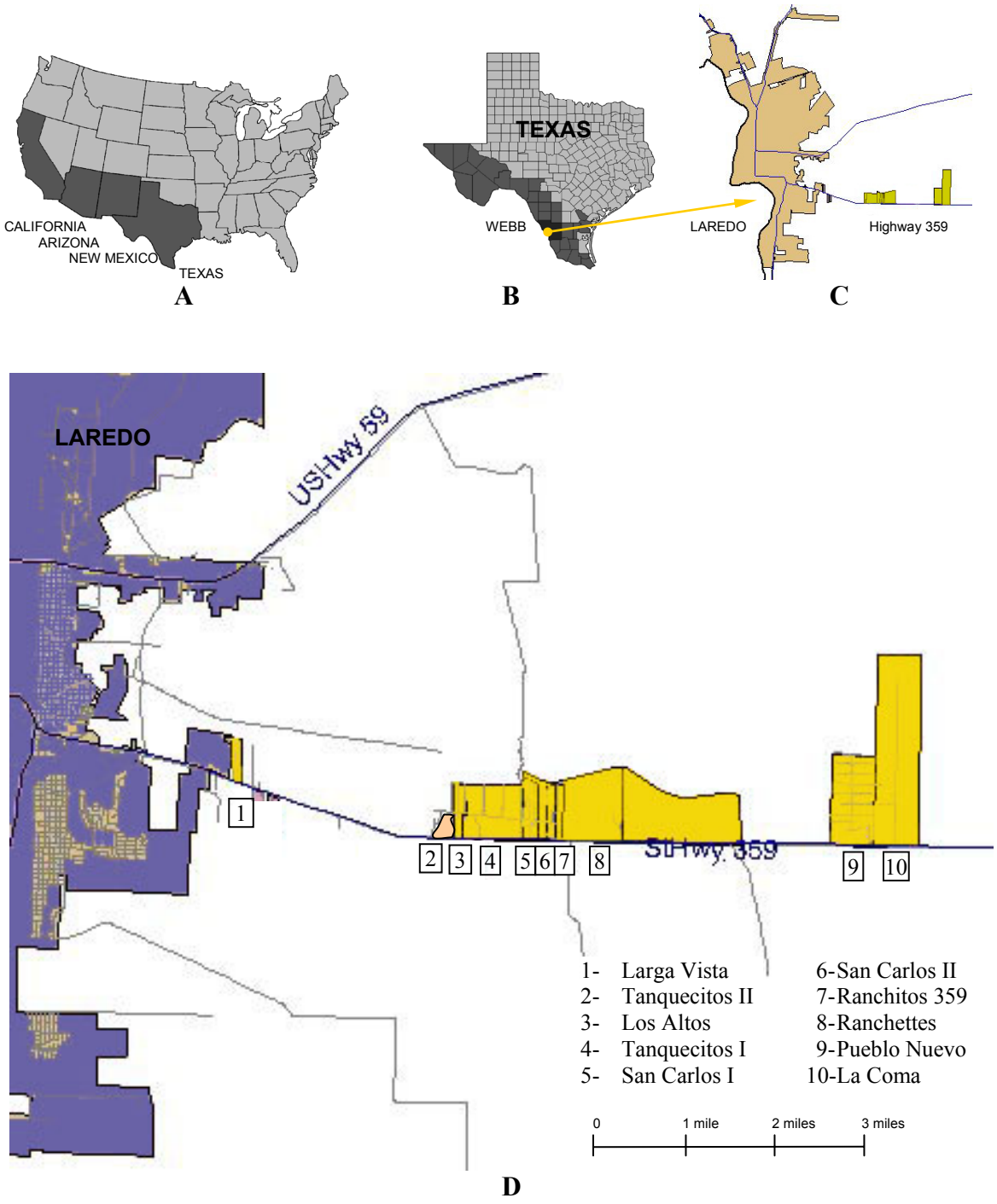

Fig 13. Location of colonias case studies
A-Colonia Border States; B-Texas Counties; C-City of Laredo, Webb Cty, TX
D- Colonias on Highway 359 (source; Office of the Attorney General of Texas).

The ten colonias comprised an approximate population of 3,030 people out of the 16,353 people who inhabited colonias on Webb County according to the 2000 Census (Attorney General of Texas, 2000; Ward, 1999). The relationship between size and population of colonias varies widely. Some of the smallest colonias have the largest populations. Larga Vista is the densest one with 36 acres and 544 inhabitants. San Carlos I, San Carlos II and Los Altos have somehow smaller populations (345, 249 and 474 inhabitants respectively) but they are bigger (82, 45 and 53 acres respectively). Some of the largest colonias such as Tanquecitos I (South Acres) and Pueblo Nuevo (303 and 369 acres respectively) have also large populations (404 and 603 inhabitants respectively), while others such as Ranchettes and La Coma (442 and 777 acres respectively) have smaller populations (85 and 96 inhabitants respectively). However, when population size is contrasted with the number of occupied lots most colonias are around 4.32 and 6.85 inhabitants per occupied lot. That seems to place colonias lots close to many conventional residential subdivisions. Only Laredo Ranchettes, a very rural like colonia, shows a higher ratio of 10.6 inhabitants per lot. However, only Larga Vista, Los Altos, San Carlos I and II and Ranchitos 359 East would fall within the category of a more conventional "suburban" like subdivision. This is mostly because of the ratio between their total number of lots and their reduced extension, all of them between 36 and 82 acres. Given the larger size of the lots and larger extensions (all between 303 and 777 acres), the rest of the colonias are very rural in character (see figure 14).

Although all colonias have electricity, only Larga Vista and 85 inhabitants of Pueblo Nuevo have access to water and sewage services in their lots. The rest of the

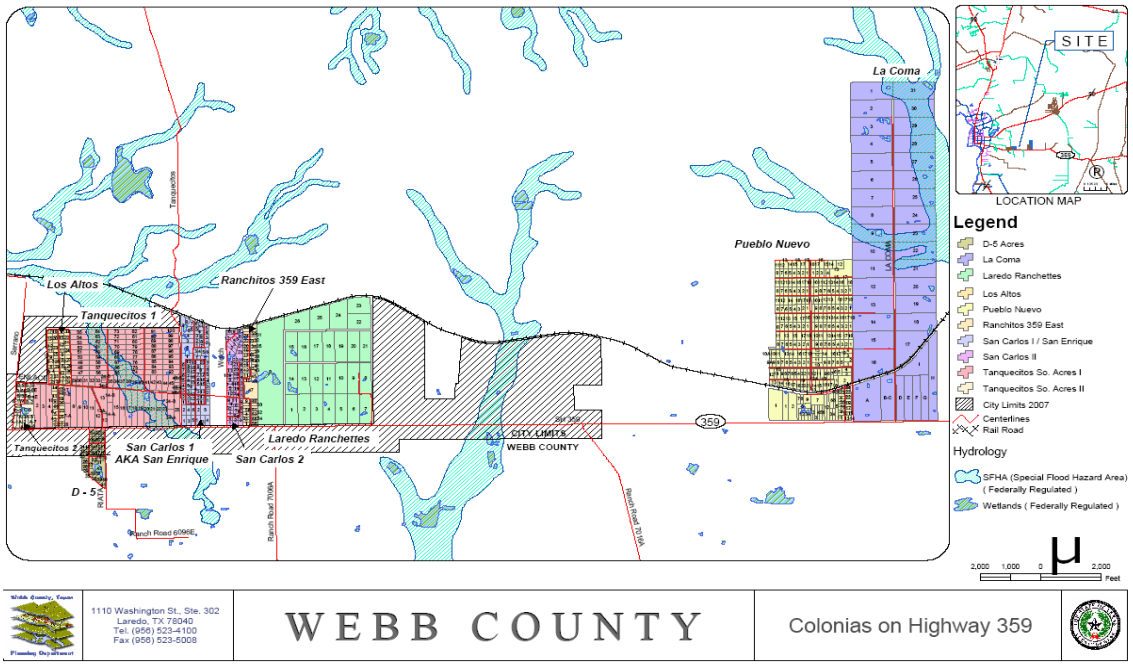

Fig 14. Colonias on Highway 359, Webb County, Texas (source: Webb County, Planning Department).

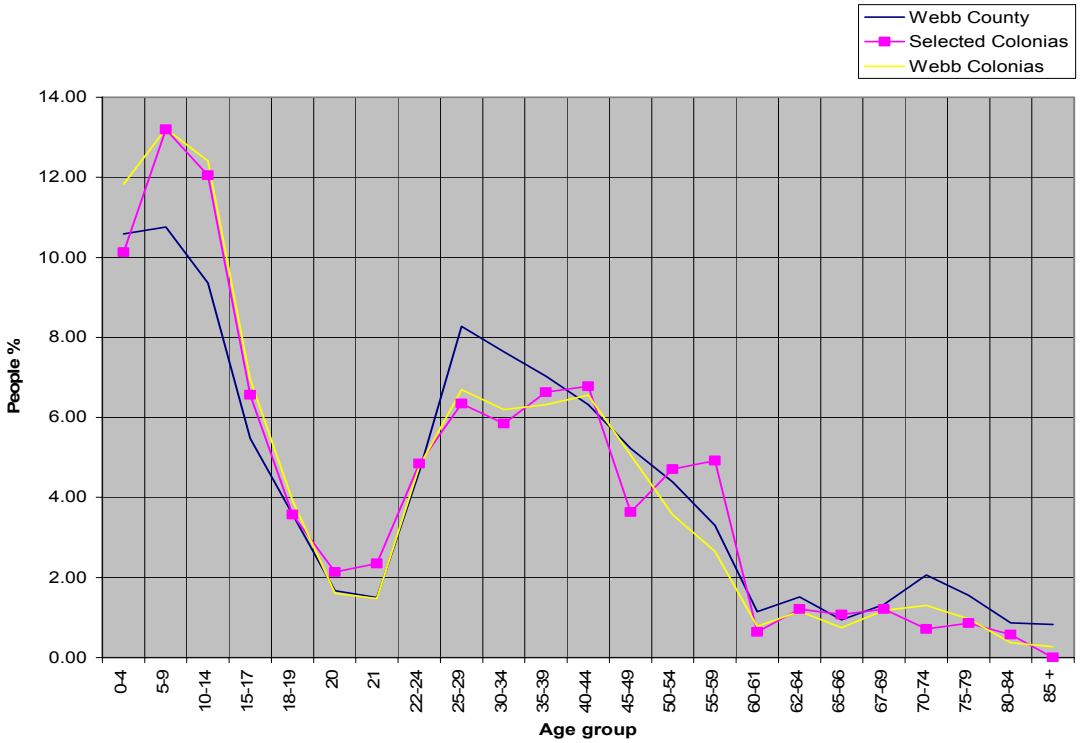

Fig 15. Age Distribution in colonias case studies (Source: US Census 2000).. Comparison of the selected colonias with Webb colonias and Webb County

inhabitants have to import water and deal with waste-water very much on an individual basis. This is reviewed in greater detail in the description of colonias at the end of this section.

4.2 Preliminary Analyses

The preliminary analysis phase of the study used secondary data to determine categories of house forms and households. Secondary data consisted of household information from the 2000 US census and aerial photographs of the ten colonias taken at different times.

Household data were disaggregated at the block level to identify preliminary categories of household types (size, head of the household age, gender, composition including family and non-family members, age and gender distribution). Unfortunately, the intention of verifying changes since the 1990 census was not possible since census blocks did not have the same physical boundaries.

The selected colonias showed similarities in population, household and housing characteristics with the colonias of Webb County as a whole. Most inhabitants were Hispanics (97.29%), with a slightly larger male than female population (50.93% vs. 49.07%). The population over 18 years old of age was 58.06%, age distribution was very similar to the larger population of Webb colonias (see figure 15) and age distribution for females and males was also similar (see figure 16 and 17). The median age for the selected colonias was included in the 22-24 year old group as compared to the 21 year

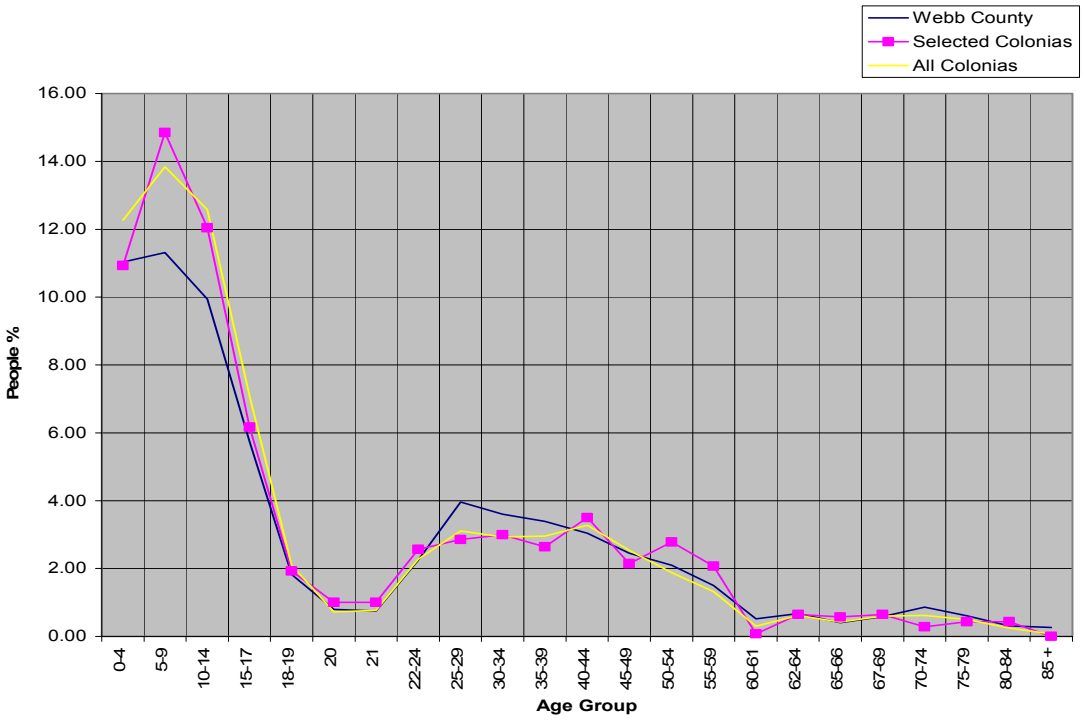

Fig 16. Age Distribution male population in colonias case studies (US Census 2000). Comparison of the selected colonias with Webb colonias and Webb County

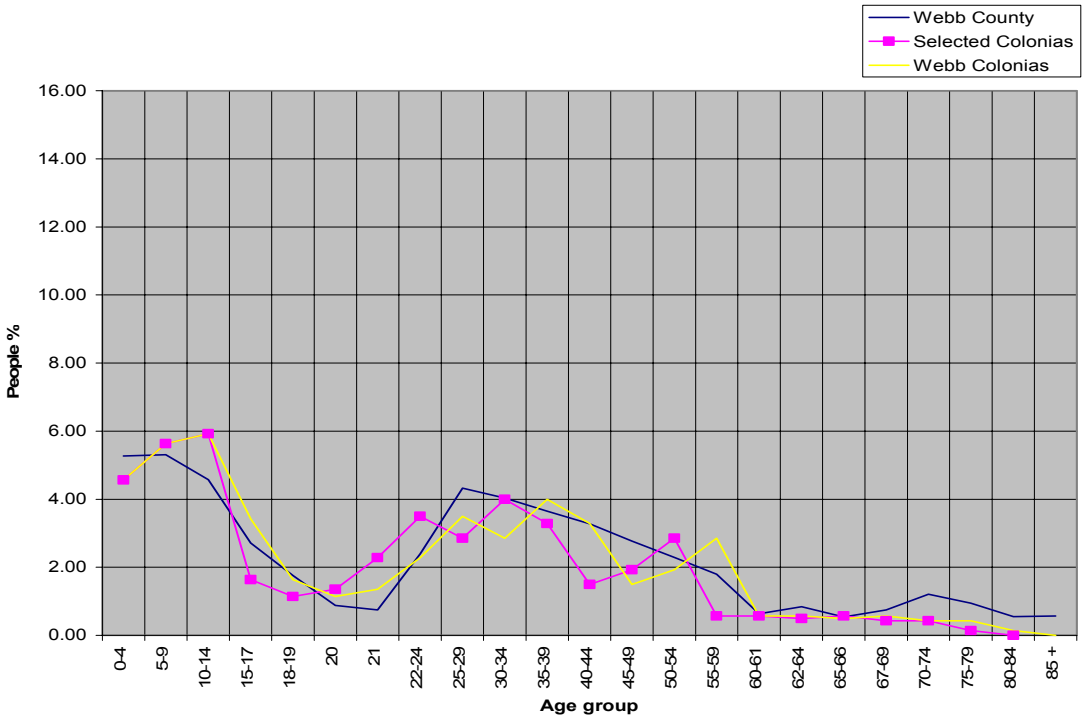

Fig 17. Age Distribution female population in colonias case studies (US Census 2000). Comparison of the selected colonias with Webb colonias and Webb County

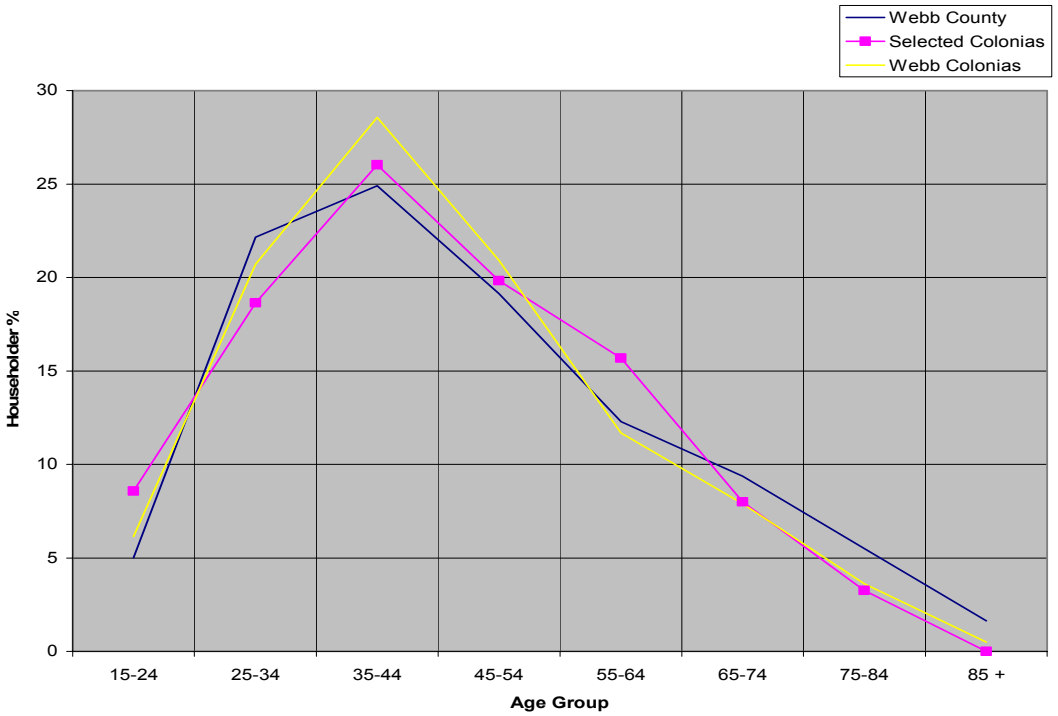

Fig 18. Age of household head in colonias case studies (Source: US Census 2000). Comparison of the selected colonias with Webb colonias and Webb County

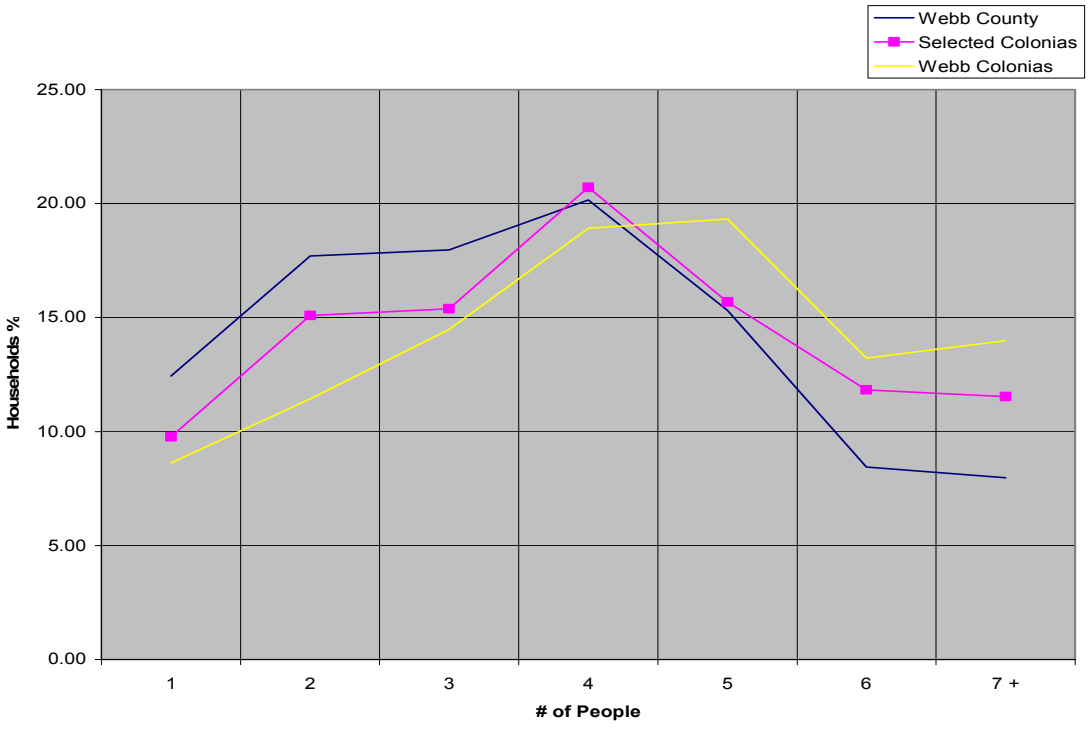

Fig 19. Size of the household in colonias case studies (source: US Census 2000). Comparison of the selected colonias with Webb colonias and Webb County

old group for the Webb colonias. The vast majority of household heads were between 25 and 54 years old with the largest group between 35 and 44 years (see figure 18). The average household size was 4.15 people and 90.24% were households of two or more people (see figure 19). Only a small percentage of households had non-relatives living with them (7.10%). A considerable amount of units were unoccupied (22.12%) and out of those occupied most were owned by their households (82.25%) with a small percentage rented to the occupants (17.75%) (see figures 20 and 21).

Table II summarizes and compares the characteristics of the selected colonias with data for the universe of Webb colonias and all the Webb households.

Table II. Demographic, household, and housing characteristics of selected case studies.

	unit	Webb County	Selected Colonias	All Webb Colonias
Hispanic population	(%)	94.28	97.29	97.35
Hispanic householders	(%)	92.14	97.04	96.50
Male population	(%)	48.17	50.93	50.19
Female population	(%)	51.83	49.07	49.81
Population <18 years	(%)	36.18	41.94	44.40
Population >18 years	(%)	63.82	58.06	55.60
Population median age group	(year group)	25-29 (26.50)	22-24	21
Male population median age	(year group)	25-29 (25.20)	21	20
Female population median age	(year group)	25-29 (27.60)	22-24	22-24
Average household size	(people)	3.75	4.15	4.43
Average family size	(people)	4.10	4.46	4.72
1 person households	(%)	12.44	9.76	8.62
2+ people households	(%)	87.56	90.24	91.38
Households w/non-relatives	(%)	7.58	7.10	6.51
Households w/o non-relatives	(%)	92.42	92.90	93.49
Occupied housing units	(%)	91.91	77.88	84.01
Vacant housing units	(%)	8.09	22.12	15.99
Owner occupied units	(%)	65.67	82.25	81.81
Renter occupied units	(%)	34.33	17.75	18.19

Source: Census 2000, US Census Bureau
Note: For data on colonias only the blocks located within the physical boundaries of colonias have been considered.

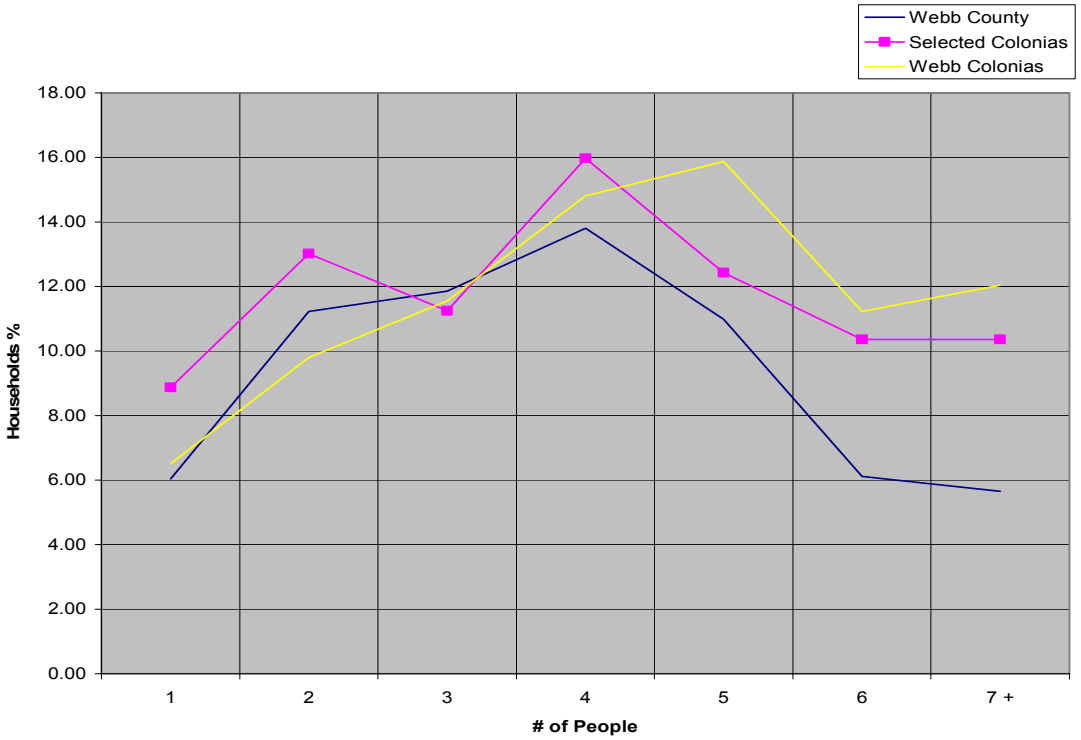

Fig 20. Size of the household – owners (Source: US Census 2000).
Comparison of the selected colonias with Webb colonias and Webb County

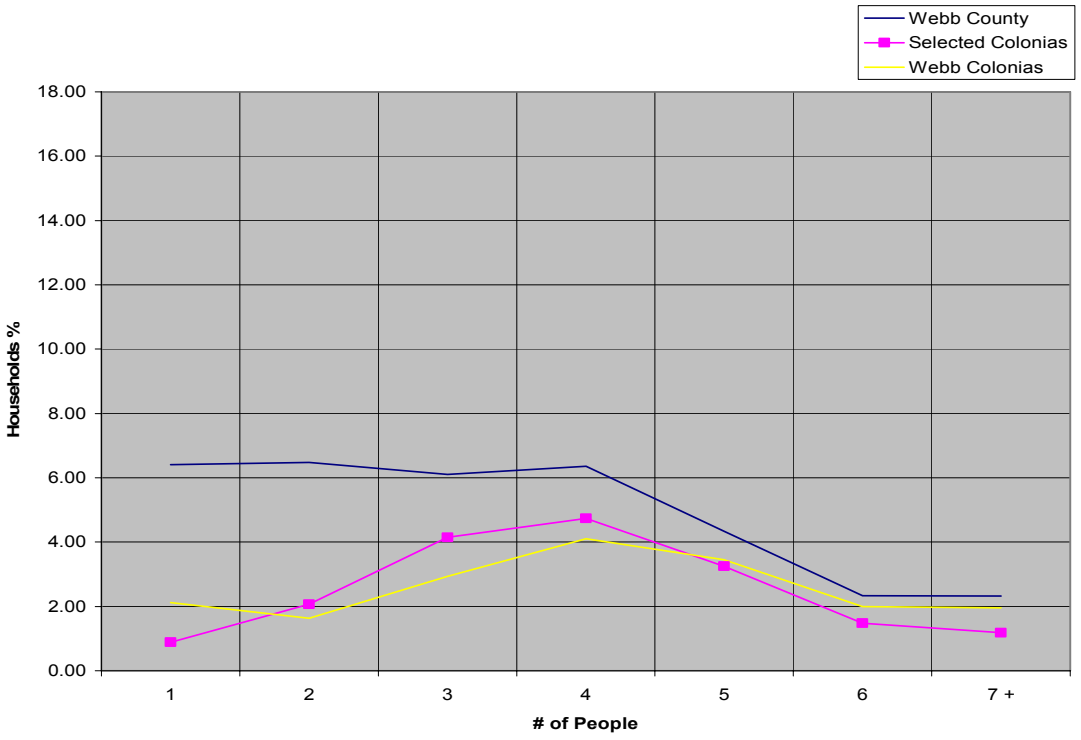

Fig 21. Size of the household – renters (Source: US Census 2000).
Comparison of the selected colonias with Webb colonias and Webb County

Conversations with the director of the Webb County Planning Department and personnel in the GIS office during preliminary field visits revealed that records of Webb County do not list Las Blancas as a colonia because it is an uninhabited area, even though it is identified as a colonia by the 2000 Census information and the Attorney General of Texas website. On the other hand, Tanquecitos II, a small colonia of 29 lots and about 13 households which were there since the mid-1980s, were unaccounted in the 2000 Census. These findings raised doubts about the reliability of the census information on these colonias. Thus, that this information is included in this report can only be explained because the authenticity of the 2000 census data was not questioned during preliminary analyses as it was the only available source of demographic data for these colonias. In addition, and for the purposes of this investigation, it can also be said that the number of households involved in this census omission was too small to alter the outcome of preliminary analyses.

4.3 Design of the Survey Instrument

Using categories found in the preliminary analysis, a semi-structured interview was designed to collect information about the household and the house structure over time. The interview consisted of an introductory presentation and four sections with fill-in, multiple choice and open-ended questions. The presentation consisted of one page describing the purpose of the study and the significance that participation in the survey had for the study. The first, second, and third sections sought a description of the current's household structure, each member's age and gender, their relationship with the

household head, educational background, occupation and employment. The fourth section sought information about the households' last moving to their present colonia and previous place of residence, characteristics of the structure originally built on the lot and its successive stages up to the present conditions, as well as future plans. The instrument included a receipt for the small gift card incentive for participation ($10 Walmart card). A single member household whose house was built in one stage would have to answer a minimum of 42 questions. This number could increase up to more than 100 questions depending on the number of household members and the number of stages used to build the house. Every page of the interview instrument had exactly the same content written in English on one side and in Spanish on the other. The intention was to perform the interview in the language that was more comfortable for the household head. The complete survey instrument is included in the appendix C of the dissertation.

The survey sample was selected by inputting the lot identification numbers of each colonia and scrambling them using a random number generator. Then a list for each colonia was produced selecting the first 15% of the lots and a sequence of aerial photographs for each lot was generated. If a selected lot in a colonia turned out to show as un-built in the aerials, then the next lot on the random sequence was included in the list for the colonia and the new sequence was generated. This procedure produced a sample that included only built lots selected by means as free of bias as possible.

The research protocol and survey instruments were review and approved by the Institutional Review Board for human subjects in research. Fieldwork was developed and completed without changes to the protocol.

4.4 Fieldwork

Preparation for fieldwork was made in December 2006 during preliminary visits to the A&M Colonias Program Center of Laredo. The director of the regional center and the local coordinator of the *promotoras*[23] program reviewed and evaluated the survey packet. The packet included of a guide for the interviewer in both English and Spanish, copies of the survey instrument also in both languages, a list of the randomly selected lots to survey in each colonia, copies of county maps of the colonias to survey, and sequences of aerial images of the structures on the lots selected to survey in several times. The observations to the survey and suggestions made by the regional director and the promotoras program coordinator to improve the packet were noted and incorporated in the final version. These included changes to match local colloquial Spanish so materials could be easily understood by research assistants and households. This had the effect of making Spanish the primary language of the survey instrument. The survey was originally designed with the English version in the front of each page and the Spanish translation in the rear. All pages were reversed to reflect the primary language.

Planning for the data collection process included hiring a team of 10 research assistants to be trained in the specific tasks of conducting the survey. Training of the research assistants was scheduled for the week before the beginning of the data collection process. Research assistants were hired from the group of promotoras and

[23] Promotoras is the name received by community workers trained under the Texas A&M Colonias Program to work in the Texas colonias. It s a Spanish term which literally means promoter. The full term *promotor social* (male) or *promotora social* (female) is used in Latin American countries to refer to social workers.

Vistas[24] who worked for the Texas A&M Colonias Program in the communities of Highway 359.

During the last week of February 2007, research assistants scheduled to work in the data collection process met with the principal investigator and the colonias program coordinator to receive training in the different aspects of administration of the survey instrument. The group of research assistants was reduced to half the originally intended number due to a shortage in the available personnel. Research assistants were selected exclusively from the group of promotoras who worked at the selected communities of Highway 359, Laredo, TX. These promotoras worked in the Community Center of Larga Vista which served all the colonias west of the city of Laredo. The promotoras were experienced in collecting data from these communities through the use of questionnaires and interviews.

Training emphasized familiarizing research assistants with the topics dealt with by the survey and teaching them to make accurate estimates of spatial dimensions and measuring. Survey kits were distributed to the research assistants and mechanisms to audit the survey process established. Kits were composed of rigid multi-pocket cases containing a survey tablet, a notebook, the interviewer guide, surveys and pens. The colonias program coordinator received two boxes containing 200 surveys, 160 gift cards, and randomly generated lists of lots to be interviewed with aerial photographs and county maps of each of the colonias to be surveyed.

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[24] *Vistas* are members of the Volunteers in Service to America program created in 1965 as part as the war on poverty programs by the Office of Economic Opportunity. VISTA became part of the AmeriCorps programs in 1993.

The research assistants were instructed to use lists, aerial images and maps to locate and interview households following the order of the randomly generated list of lots for each colonia. If a lot turned out to be uninhabited, promotoras were instructed to report it and move to the next lot in the random sequence, to maintain the interviewed sample as free of bias as possible. The colonias program coordinator agreed to manage the distribution of work, the collection of completed surveys, and communication of unexpected issues to be addressed to the principal investigator.

Fieldwork was conducted between February 08 and June 08, 2007, by a team of five promotoras who worked as research assistants throughout the whole project. The team was supervised by the colonias program coordinator during the first three months of work. Weekly conference call meetings were scheduled between the data collection group in Laredo and the principal investigator in College Station to resolve unexpected problems. The principal investigator traveled to the site and supervised the team for the last three weeks of data collection. A total of 123 surveys were administered in a four month period. About 50% were completed during the first 3 months and the remainder during the last month. Initial less productive weeks rendered about 5 surveys per week. As survey strategies were redefined and interviewer productivity improved. Towards the end of the data collection process, production increased to 20 surveys per week.

Several problems and limited time to work on the interviews affected productivity of the research assistants who were required to work simultaneously on other projects for the Texas A&M colonias program. There were several weeks in which research assistants worked one or two days on this survey. Coordination of the survey

also had severe limitations. Coordination required distributing the work, collecting completed surveys, and receiving and communicating feedback about the data collection process to the principal investigator to resolve bottlenecks and shortcomings. Coordination was particularly critical during the first weeks of data collection, when feedback of the effectiveness of the survey procedures and evaluation of the efficiency of the data collection process were important to redefine and refine data collection strategies. Unfortunately, the process was very slow at the beginning and the various setbacks made efficient coordination difficult until data collection was totally interrupted in the second month for about three weeks. An additional issue affecting continuity of the data collection was the irregular payment by the administration of the A&M Colonias Program of honoraria to the research assistants. Unfortunately, it took research assistants almost two months after the work was completed to receive payment for their work, even though money was allocated and available from the beginning of the data collection process and worksheets were sent to the administration of the A&M Colonias Program monthly. All these issues prolonged a process that was originally planned to be completed in 6 weeks to 18 weeks.

Productivity was also directly affected by the need to refine the surveying procedure. The survey differed in many ways from the kind of surveys that promotoras were used to doing. Promotoras usually conduct door to door visits, mainly collecting simple household information regarding health, education, and demographics. Many colonia residents are used to certain protocols and are willing to comply with providing this type of information. But colonias residents are also subjects of many other

researches and interviews from public and private entities. Unfortunately, years of field surveys and visits with unclear or no visible outcomes have thwarted rapport and cooperation with the work of promotoras. Although this is something that can be expected when attention to certain populations extends over time, the amount of "study fatigue" of this population was underestimated.

Although it was expected that the promotoras' familiarity with the colonias would overcome the reluctance of residents to participate in this research, the fact is that colonias' residents have lost interest in cooperating in surveys. This is especially true with some of the older and better-off residents, who feel uncomfortable attracting the interest of researchers. Unfortunately, because of the problems identified above, it took some time to realize the principal investigator awareness and solutions to this were long delayed. Once identified, however, steps were taken to redesign the approach to the colonia communities and work out new strategies to regain rapport with residents. Consequently, problems became minimal and the flow of work reestablished.

4.5 The Interviewing Process

As a consequence of the events previously described, the field survey procedure went through changes. The final procedure required two or more visits per household to complete the interview. In a first visit, research assistants drove to the colonia in groups of two or more and contacted households to introduce the research to the head of the household or the head's partner. If neither of them were present, a flier with a brief

description of the project and contact phone number of the research assistant was left at the gate of the lot or to the person who opened the door.

If one or both were present, some household heads were willing to proceed with the interview immediately. In most of the cases, however, interviews were arranged for a later time, usually the following day. On the agreed upon day, pairs of research assistants visited scheduled groups of households between 9:00am and 3:00pm. In some cases, appointments had to be rescheduled a second or a third time because household representatives were not available at the scheduled time. After the third unsuccessful attempt the interview was usually cancelled. Overall, after several changes perfecting it, this was the procedure that produced the best outcome. Completed surveys were faxed on an ongoing schedule in groups of approximately ten for verification, control and review by the principal investigator.

4.6 The Colonias Surveyed

The ten colonias researched in this study are located within 8 miles of the limit of the city of Laredo (see figure 22). The first colonia, Larga Vista, was included because it was a colonia for many years, although was recently incorporated into the city of Laredo. Even though Larga Vista is not considered a colonia under the legal definition of the term, this study included it because of its origin and history as a colonia. The ten colonias comprised a total of 962 lots with a population of 3,015 inhabitants. The differences in size, lot characteristics, and level of development make these colonias representative of the diversity of colonia types in Webb County. A summary of these characteristics in presented in table III.

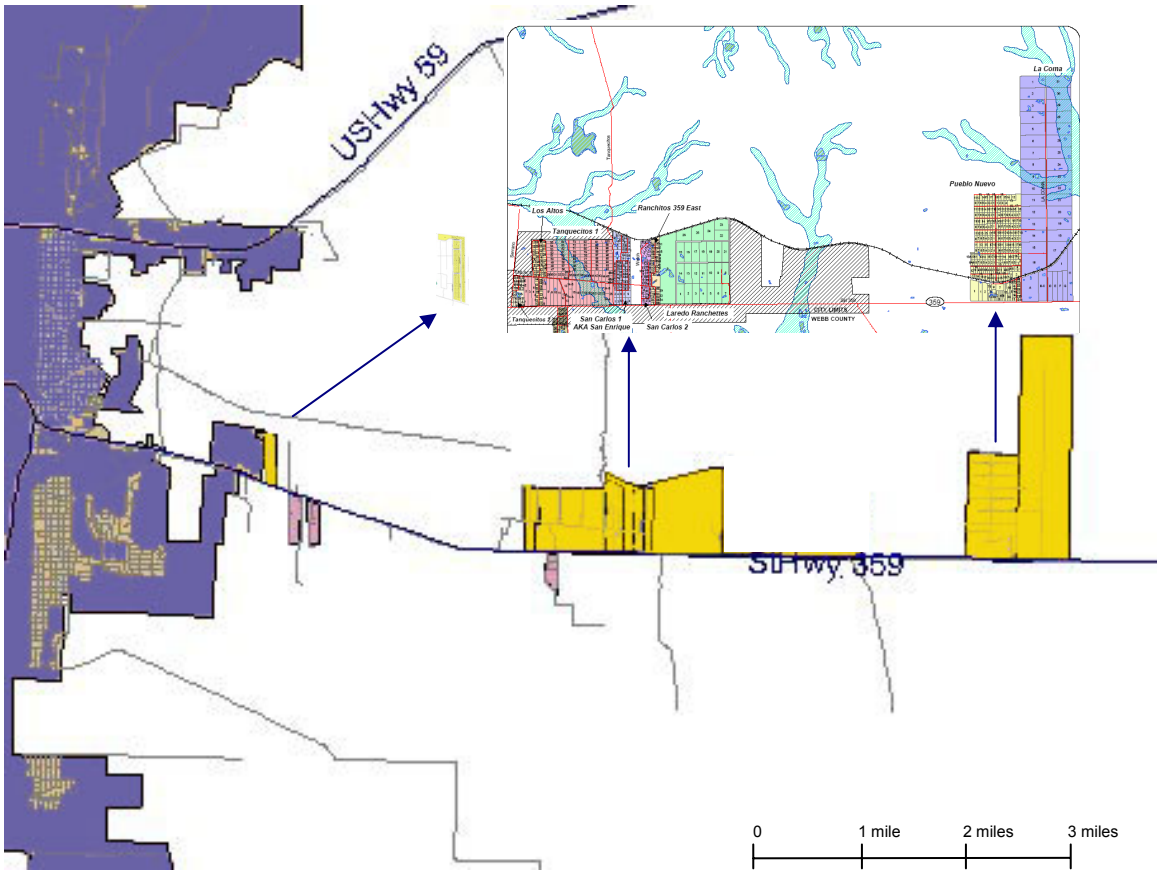


Fig 22. Overlaying maps of colonias on Highway 359, Webb County, Texas (sources: Office of Attorney General of Texas and Webb County, Planning Department).

Table III. Characteristics of the colonias surveyed.

Colonia	Recorded	Population	# of lots	Lot Size (acres)	Lot dimensions (front/depth feet)	
Larga Vista	----	544	140	0.2	67	130
Tanquecitos I	03/18/1987	404	111	0.4	105	165
Tanquecitos II	03/18/1987	--	29	2.5	183	580
Los Altos	08/28/1985	474	96	0.5	112	180
San Carlos I	05/16/1985	345	98	0.5	147	147
San Carlos II	05/16/1985	249	62	0.5	111	196
Ranchitos 359	10/23/1985	215	56	0.5	102	213
Ranchettes	10/02/1973	85	27	12.0	450	1150
Pueblo Nuevo	07/16/1986	603	304	1.0	140	311
La Coma	11/22/1971	96	39	20.0	645	1350
	Total	3,015	962			

Lots in the selected colonias presented diverse sizes that ranged from the residential 1/5 acre for the smallest lots to ranches of about 20 acres for the largest ones. Eighty three percent of the lots were of one acre and under (35% 1 acre and 48% ½ acre or smaller). Beyond that, almost 10% were 2.5 acres, and around 7% of them were small ranches between 12 and 20 acres.

With the exception of Larga Vista, which had the smallest lots, the biggest lots were found in the oldest colonias registered (1971 La Coma and 1973 Ranchettes). This, and the distance of these last colonias from the city limits explain the rural character of these colonias. All other colonias were registered between 1985 and 1987 and they were denser showing a more residential character. As pointed out, Larga Vista had a more urban character, due to its proximity to Laredo and the small size of its lots. It is likely, however, that even Alta Vista had a more rural character during its initial times. From observations in the aerial photographs, the character of a colonia was more related to the overall development of the colonia rather than their age. Colonias closer to the city limits

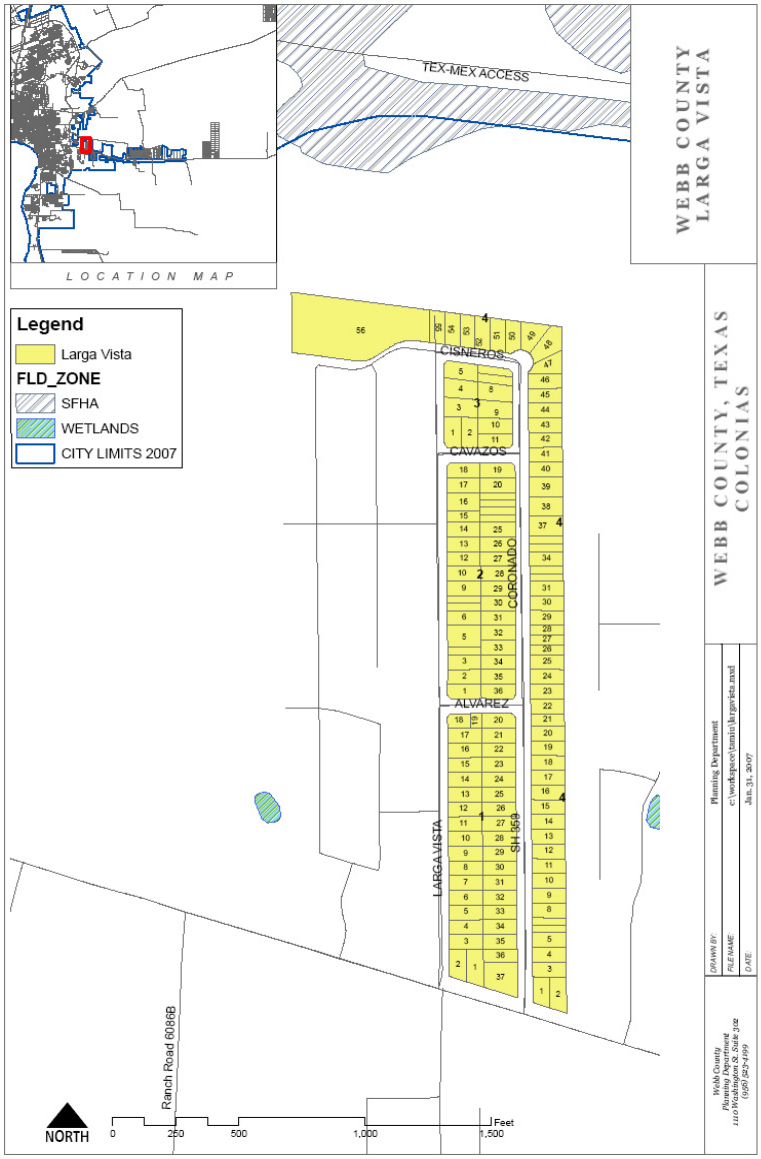
were developing faster than farthest ones. Consequently, these differences in character did not alter the decision of analyzing all the ten colonias. The main reason for this consideration was to keep a diverse range of colonias type represented in several colonia types rather than looking for a homogeneous type of colonia. The fact that all of them were initially lots sold by large land owners under a contract for deed to households that had very limited options in the existing housing market of Laredo is what defined them as colonias.

Even though there is no clear distinction between these kinds of colonias in the literature, there were differences in the character of these settlements. All types of colonias had been unregistered subdivisions of land sold with the promise of future services and facilities. However, building and population densities were much lower in the colonias composed mainly of rural ranches. In addition, the kind of activities developed in the larger, more rural lots included raising small crops, raising animals (small herds of goats, horses and even cows), and activities more expected of small ranchers rather than urban dwellers. In the smaller lots, on the other hand, some small animal raising did occur (chicken and birds) in cages and corrals, but other complementary activities were more urban in character and included small shops, convenience stores, and other services (hairdressing and other vocational trades).

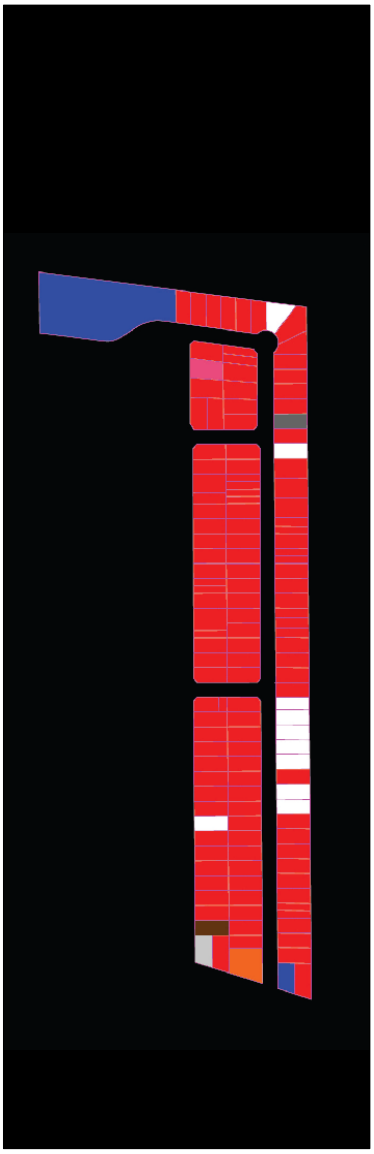
Ongoing construction activity existed in all colonias as shown by unfinished buildings and construction materials. It was clearly a long term construction process, thus, unfinished facades, half built walls, and un-built foundation slabs were common place. A descriptive account of the characteristics of each of the colonias surveyed is included below.

4.6.1 Larga Vista

Larga Vista was the oldest of the colonias studied. It was a subdivision created on unincorporated land around the 1980s under the name of "Empresas El Rancho" by land owner/developer. Larga Vista was about 36 acres in size (according to the office of the Attorney General of Texas). The colonia extended along Highway 359 about 500 feet and to the north for about half a mile (2,750 feet). As the city of Laredo extended its boundaries, Larga Vista became incorporated into Laredo. Platting by the county occurred in 1995, giving the residents the possibility to access city services and other opportunities. Larga Vista currently has electricity, water and sewer service, paved streets and sidewalks. The building of the county's first Self-Help Center and the first Community Center (built during the 1990s) also had a positive influence in the development of Larga Vista. The physical layout of Larga Vista consisted mainly of two long streets that run from Highway 359 to the north of the settlement (Larga Vista and Coronado). Both streets were connected by two short streets (Alvarez, Cavazos) ending in Cisneros St. that led to the Community Center. There were a total of 140 lots of similar size. Lots were 0.2 acre with approximate dimensions of 67 x 130 feet. The majority of lots were used for residential purposes with the exception of the lots on Highway 359, which were used for retail and industrial activities, and a large lot that housed the Community Center. About 10 lots were subdivided into two smaller lots before the county platted them. Thus all lots were registered and land could be legally sold and purchased. A few houses also combined residential and some productive activity such as workshop (see figure 23).



Platting as of 2007 of Larga Vista
(source: Webb County, Planning Department)



Lot use based on survey

Lot use in Highway 359 colonias, Webb County, TX

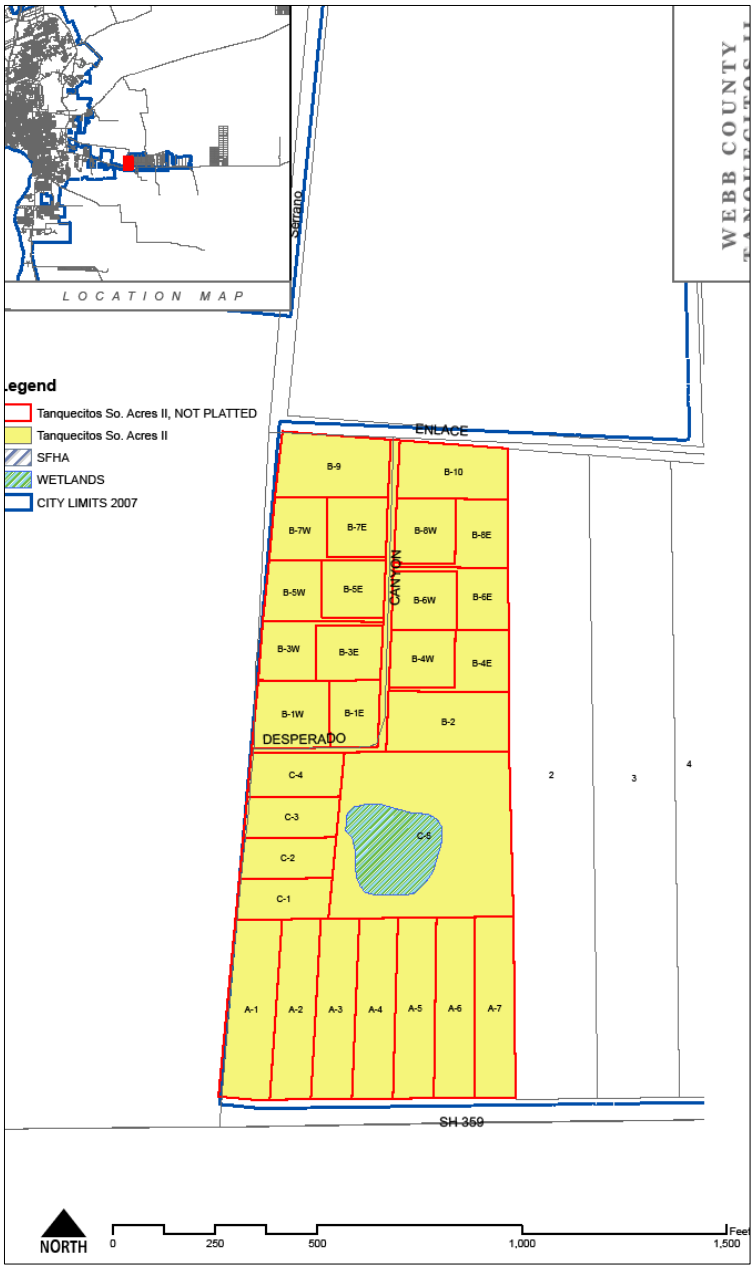
Empty Lot	Industrial
Abandoned structure	Ranchette
Residential	Junk Yard
Residential Complex	Truck Yard
Residential/Workshop	Institutional
Residential/Convenience Store	Religious
Commercial	

Fig 23. Larga Vista. Lot platting and uses

The proximity to the city, the small lot sizes, its more consolidated and denser housing, paved streets, presence of services, developed commercial activity, and presence of county agencies contributed to the urban appearance of Larga Vista. In fact, it was not officially considered a colonia anymore since it did not fit any of the definitions used for the term. Larga Vista was an excellent example of what colonias can become if progressively integrated into the life and activities of a city.

4.6.2 Tanquecitos II

The next colonia going east on Highway 359 was Tanquecitos II, about 2.6 miles after Larga Vista and the first of a sequence of 7 colonias that were adjacent to each other. It was the smallest of all colonias studied and it clustered with Los Altos, Tanquecitos I, San Carlos I and II, Ranchitos 359 East, and Laredo Ranchettes. It occupied about 25 acres (Attorney General of Texas), extending to the north of Highway 359 approximately a third of a mile (1625 feet) by 625 feet wide. There were 29 lots of which only 9 were used for residential purposes. There were a number of empty lots (6) as well as two lots that were small recreational ranches for weekends. The remaining lots were used for retail, industrial production and a junkyard business (see figure 24). Lots were of different dimensions but most were about 0.4-acre, except for the ones on Highway 359 that were of 1 acre approx. (100’ x 450’). Several of the residential plots had more than one main structure. Some even contained intricate complexes of interconnected structures housing several related households (brothers, sisters and their descendants) in a village-like pattern. Structures were built of new or recycled materials, ranging from wood to steel, and they were at diverse stages of development.



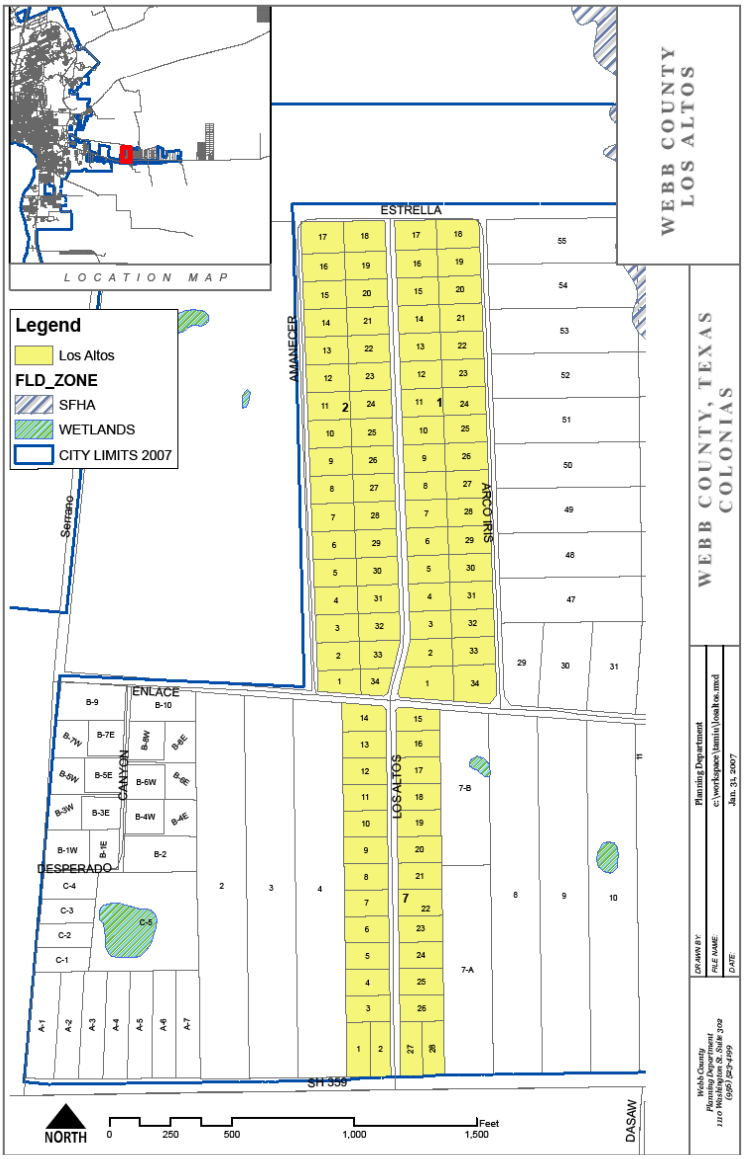
Platting as of 2007 of Tanquecitos II
(source: Webb County, Planning Department)

Lot use based on survey

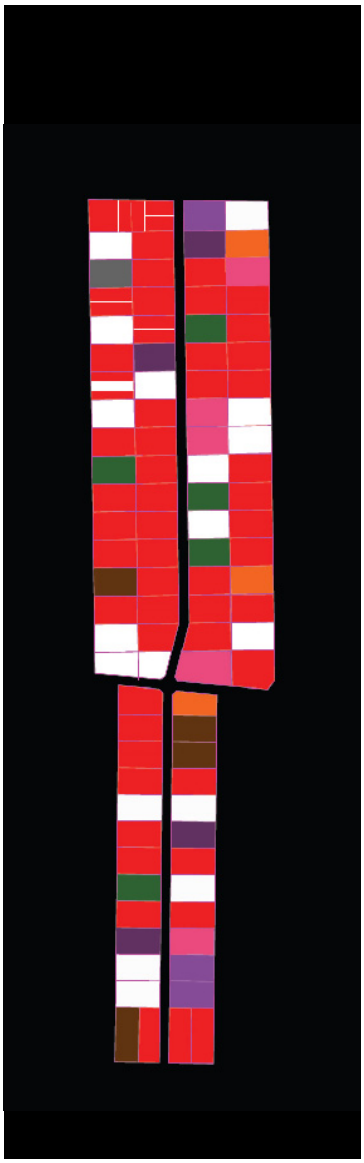
Lot use in Highway 359 colonias, Webb County, TX

Empty Lot	Industrial
Abandoned structure	Ranchette
Residential	Junk Yard
Residential Complex	Truck Yard
Residential/Workshop	Institutional
Residential/Convenience Store	Religious
Commercial	

Fig 24. Tanquecitos II. Lot platting and uses



Platting as of 2007 of Los Altos
(source: Webb County, Planning Department)



Lot use based on survey

Lot use in colonias

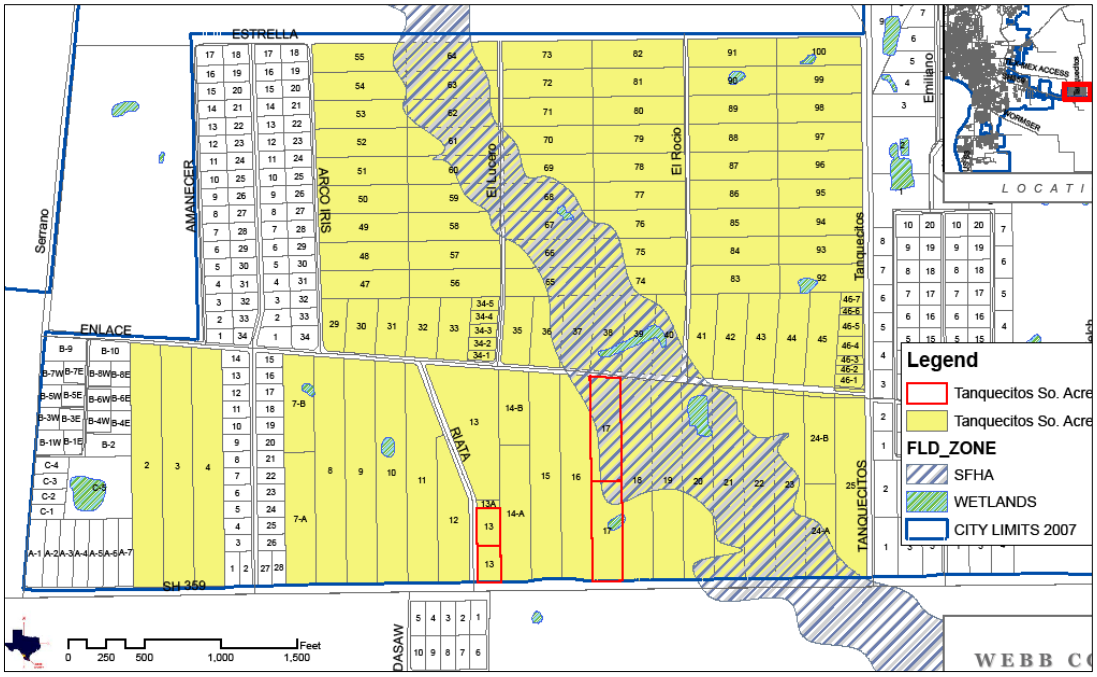
- Empty Lot
- Abandoned structure
- Residential
- Residential Complex
- Residential/Workshop
- Residential/Convenience Store
- Commercial
- Industrial
- Ranchette
- Junk Yard
- Truck Yard
- Institutional
- Religious

Fig 25. Los Altos. Lot platting and uses

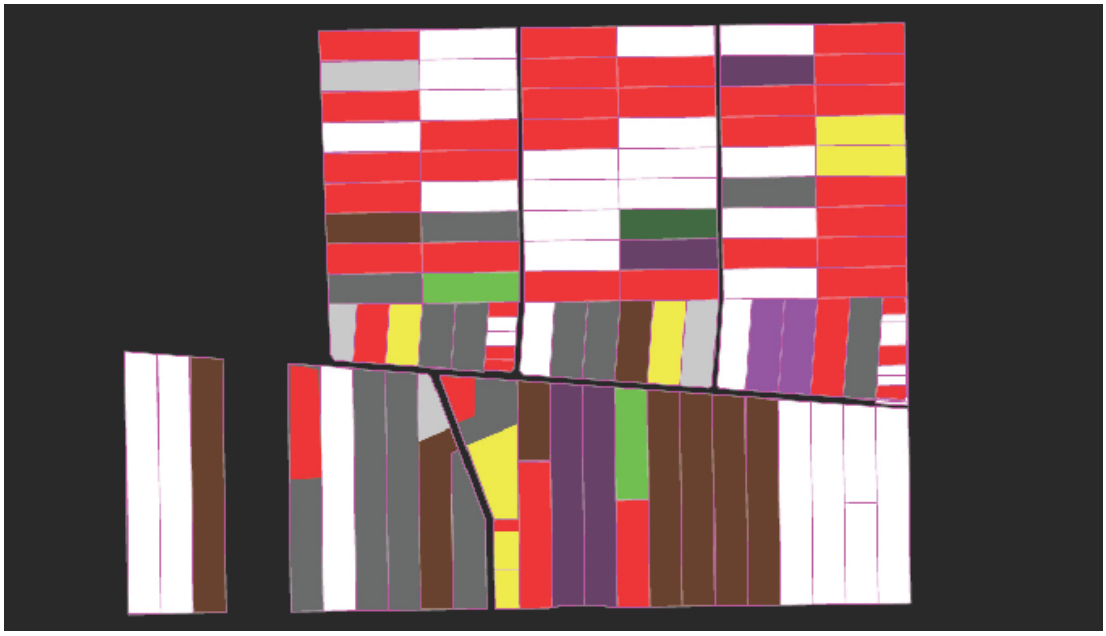
There was electric service, but water was imported and stored in tanks and containers owned by households. There were no sewers, and streets were graded but unpaved. Most lots were fenced with barbed wire, although some lots had low walls and iron fences. There was one large residential property, a large walled lot, that stood out by its size and the good construction quality. Access to and through the settlement was via a single leading street from Highway 359 that changed its name (Serrano-Desperado-Canyon), and exited to Enlace, an old street that ran parallel to Highway 359, connecting the cluster of colonias.

4.6.3 Los Altos

Located between Tanquecitos II and I, Los Altos could be accessed from Highway 359, about 1500 feet beyond the access to Tanquecitos II, through a gated street (Los Altos St.) that ran north through junk yards and other industrial lots. About 1600 feet from Highway 359, Los Altos St. connected to Enlace St. and continued north for another 2,000 feet as the colonia turned more residential in character. Two other streets ran parallel to Los Altos (Amanecer St, and Arco Iris St.) between Enlace and Estrella St. defining two long and narrow blocks. The total area of Los Altos was approximately 47 acres (53 according to AGT). There were a total of 96 lots in Los Altos; most were occupied (80) and residential (69). Residential lots were almost ½ acre with regular dimensions (112’ x 180’) (see figure 25). As with most of the studied colonias, there was no running water or sewer system. Water was imported by residents and stored in large containers or subterraneous concrete tanks called *pilas*.



Platting as of 2007 of Tanquecitos I (source: Webb County, Planning Department)



Lot use based on survey

Lot use in Highway 359 colonias, Webb County, TX

Empty Lot	Industrial
Abandoned structure	Ranchette
Residential	Junk Yard
Residential Complex	Truck Yard
Residential/Workshop	Institutional
Residential/Convenience Store	Religious
Commercial	

Fig 26. Tanquecitos I. Lot platting and uses

Being a newer colonia, it became normal to manage wastewater with septic tanks that were serviced periodically. Electricity poles and meters served all lots in the colonia and streets were graded and regularly resurfaced with a hardened crust of soils and clay called *caliche*[25]. Rainwater eventually washed out this crust and caused erosion, before roads were again leveled and recovered with a new layer of caliche. At the time of this study, streets were being re-graded and re-surfaced with new caliche. This minimum maintenance was undertaken by the county with uncertain regularity. Several residential lots had been clearly subdivided into two and three equal fenced lots, each containing a separate structure. A few lots contained clusters of more than one main structure suggesting the presence of an extended household or several tenant households. Some lots combined residential use and productive activities (such as a workshop or a convenience store), and two of the lots were used for religious facilities. Los Altos presented a developed image with most of the structures looking well consolidated and of considerable dimensions.

4.6.4 Tanquecitos I

Tanquecitos I followed Los Altos. It consisted of a row of large lots of industrial or retail character towards Highway 359, and three blocks of slightly smaller lots with more residential character, divided by two smaller streets (El Lucero and El Rocio). Tanquecitos I had an approximate area of 313 acres (303 acres according to AGT) (see figure 26). The residential sector of the colonia was reached by small streets

[25] Caliche is the term for a layer of soil particles hardened together by calcium carbonate.

perpendicular to Highway 359 (Riata and Tanquecitos) or from the street that connected Tanquecitos II and Los Altos (Enlace). Some lots on the west side shared a street with Los Altos (Arco Iris), while on the east Tanquecitos St. was shared with the adjacent colonia San Carlos I. A strip of floodplain land crossed the colonia diagonally, affecting between 25% and 90% of the surface of some 26 lots, most of which remained empty. Most of the remaining lots were about 2.5 acres (183' x 580'), contributing to the uninhabited rural character of Tanquecitos I. Some corner lots had actually been subdivided into 5 to 7 smaller lots. Mid-block lots were more difficult to subdivide due to their long depth. Thus, lots with more than one main structure were seen, although subdivisions of up to three sub-lots were also common. As in Los Altos, water was imported and stored by households in ad-hoc storage containers and tanks. Streets were unpaved, but electricity lines served the colonia, and meters were installed on each lot. Thus, in lots with more than one main structure, electric lines ran from the meter to each of the structures. In some cases, we learned that multiple households simply shared the electricity bill. Tanquecitos I seemed much less developed than any of the colonias closer to Laredo, with uncleared land and the less dense population. The structures consisted of trailers and smaller structures that had been attached to the previous structures during successive additions also contributed to this appearance.

4.6.5 San Carlos I

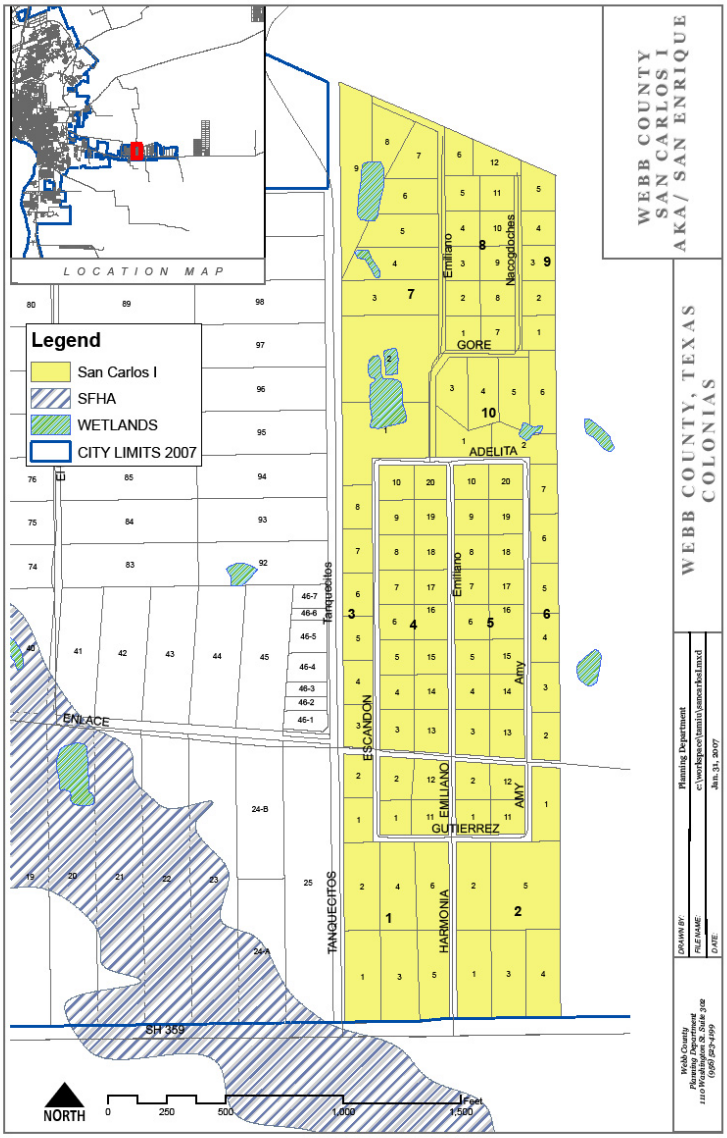
Following Tanquecitos I at 3.7 miles from Larga Vista was the gated access to San Carlos I, familiarly known as San Enrique. San Carlos I extended approximately 86

acres (82 according to AGT) and was a strip of land almost 1,000 feet wide that extended about ¾ mile (3,780 feet) to the north between Highway 359 and a set of railroad tracks. As with adjacent colonias, lots facing Highway 359 were mostly junk yards and small industries or truck repair shops. Residential construction was the dominant form in the colonia, although some workshops and convenience stores shared the lot with residences. The network of streets in San Carlos I was more elaborated than in the previous colonias. The central street (Harmonia – Emiliano) went into the colonia intersecting four secondary streets (Gutierrez, Enlace, Adelita, and Gore). Parallel to this the central street, two other streets branched out generating 6 rows of lots along the settlement. This pattern of subdivision suddenly changed to only two streets at the bottom third of the colonia as streets avoid floodable areas generating some larger lots. As a result, there were 98 lots in San Carlos I a third of which were empty, 9 were retail and industrial, and the remaining were residential. Residential lots were about half an acre (147' x 147'), with the exception of the retail and some residential lots already mentioned. The large proportion of empty lots and the large lots around the floodable areas give San Carlos I a half-inhabited appearance. In contrast, several lots had been split into three smaller lots of about 49' by 147' and others had small compounds of residential structures that probably accommodated extended households and/or tenants. Residential activity was also combined with small other activities such as welding shops or convenience stores. As most of the previous colonias studied, San Carlos I inhabitants hauled and store their supply of water in large plastic tanks characteristic of these colonias. Electricity visibly reached all lots, although some private arrangement was

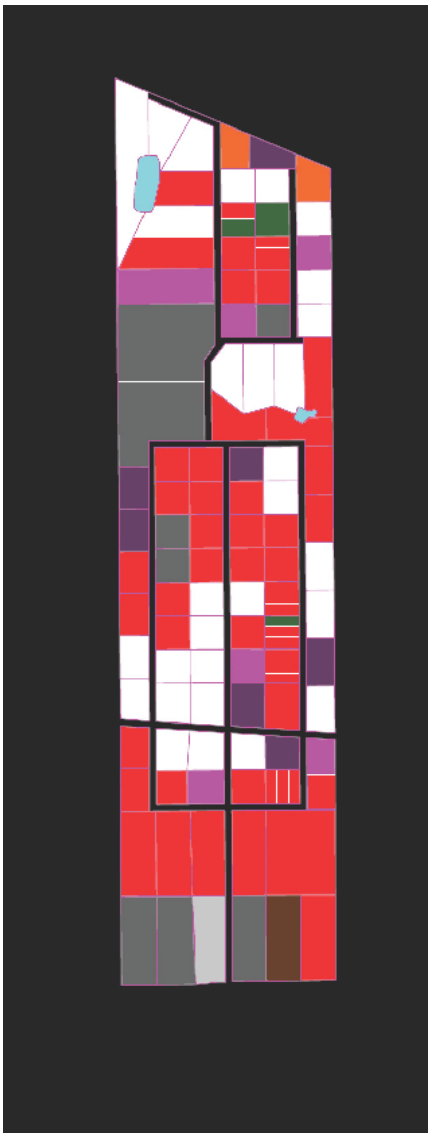
probably required in lots that had been subdivided because meters were only installed to the lots of single households. The central access street of San Carlos was in better shape than the others graded and hardened with *caliche*. The other streets eroded by rain and their daily use. Despite the smaller sized lots, San Carlos I appeared more rural than similar colonias. Empty lots contributed to this greatly, but also the type and development of structures added up to the much less consolidated look of the colonia (see figure 27).

4.6.6 San Carlos II

San Carlos II was just 1,000 feet further east from the access street to San Carlos I. It was a tract of land of about 47 acre in size (45 according to AGT), a little shorter than San Carlos I (0.65 mile) and approximately 600 feet wide. It extended north of Highway 359 to the railroad tracks. It had one single entry street (Welch) that intersected two others (Kay Bailey and Enlace) that connected to the other streets of the colonia (Barrera). There were 62 lots in San Carlos II; a third were empty. The occupied lots were mostly residential and their area is about half acre, similar to San Carlos I (roughly 111' by 196'). The lots on Highway 359 were also about half acre and only in the rear part of the colonia larger lots can be seen. Some of these lots were small ranches of 3 to 4 acres and their layout does not correspond to the dominant plot arrangement of San Carlos II (see figure 28). Again, some residential lots had been subdivided into two, three, and even four smaller fenced lots containing one residential structure each. There were also a couple of small convenience stores, a truck service shop, and



Platting as of 2007 of San Carlos I
(source: Webb County, Planning Department)

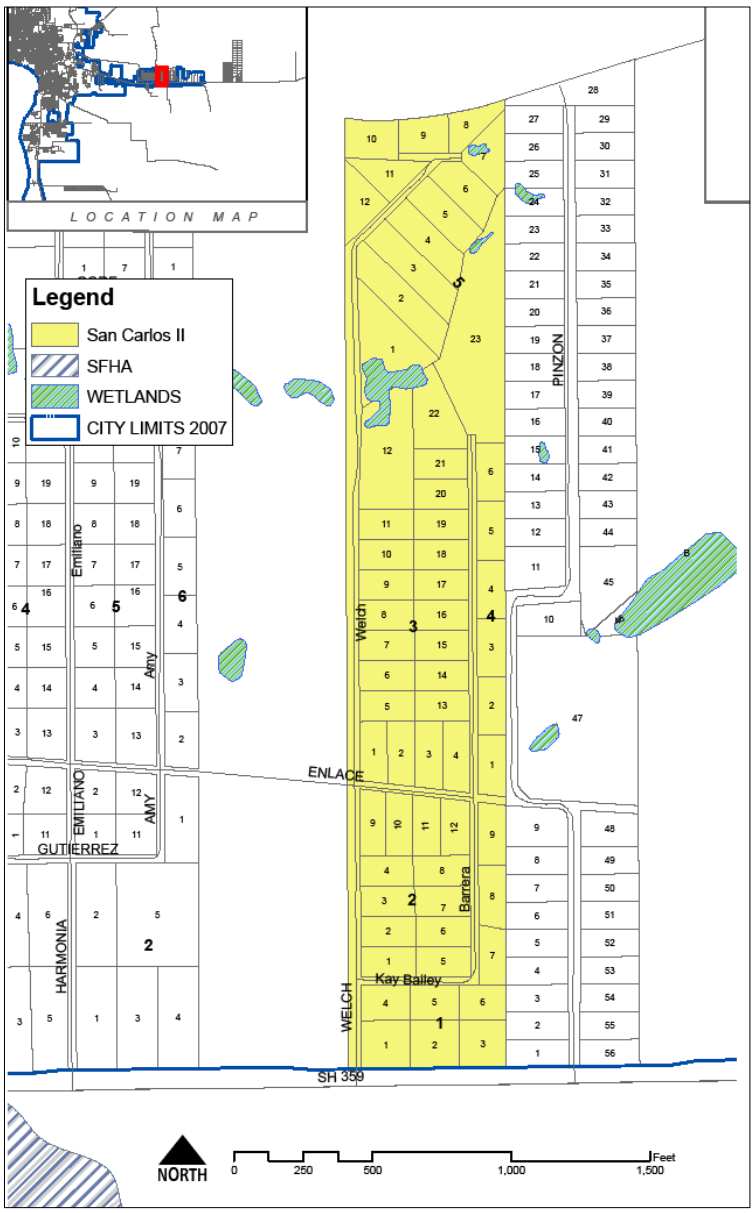


Lot use based on survey

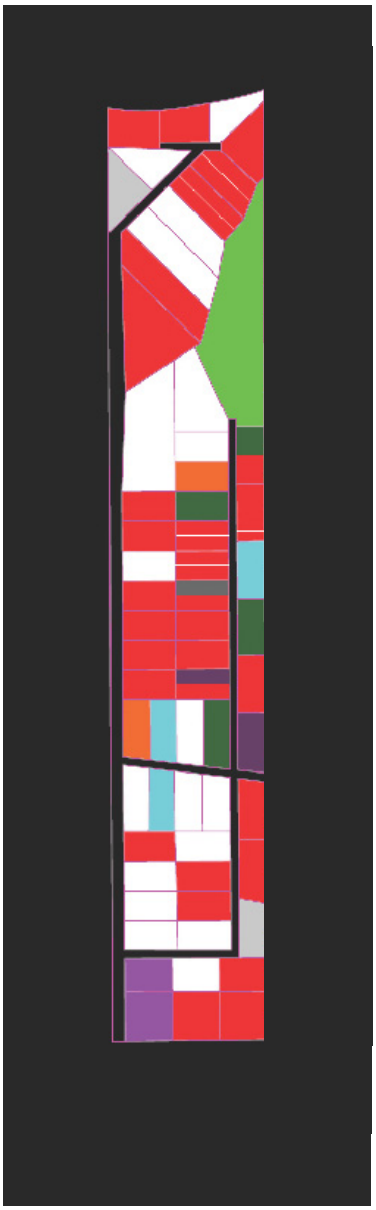
Lot use in Highway 359 colonias, Webb County, TX

Empty Lot	Industrial
Abandoned structure	Ranchette
Residential	Junk Yard
Residential Complex	Truck Yard
Residential/Workshop	Institutional
Residential/Convenience Store	Religious
Commercial	

Fig 27.San Carlos I. Lot platting and uses



Platting as of 2007 of San Carlos II
(source: Webb County, Planning Department)



Lot use based on survey

Lot use in Highway 359 colonias, Webb County, TX

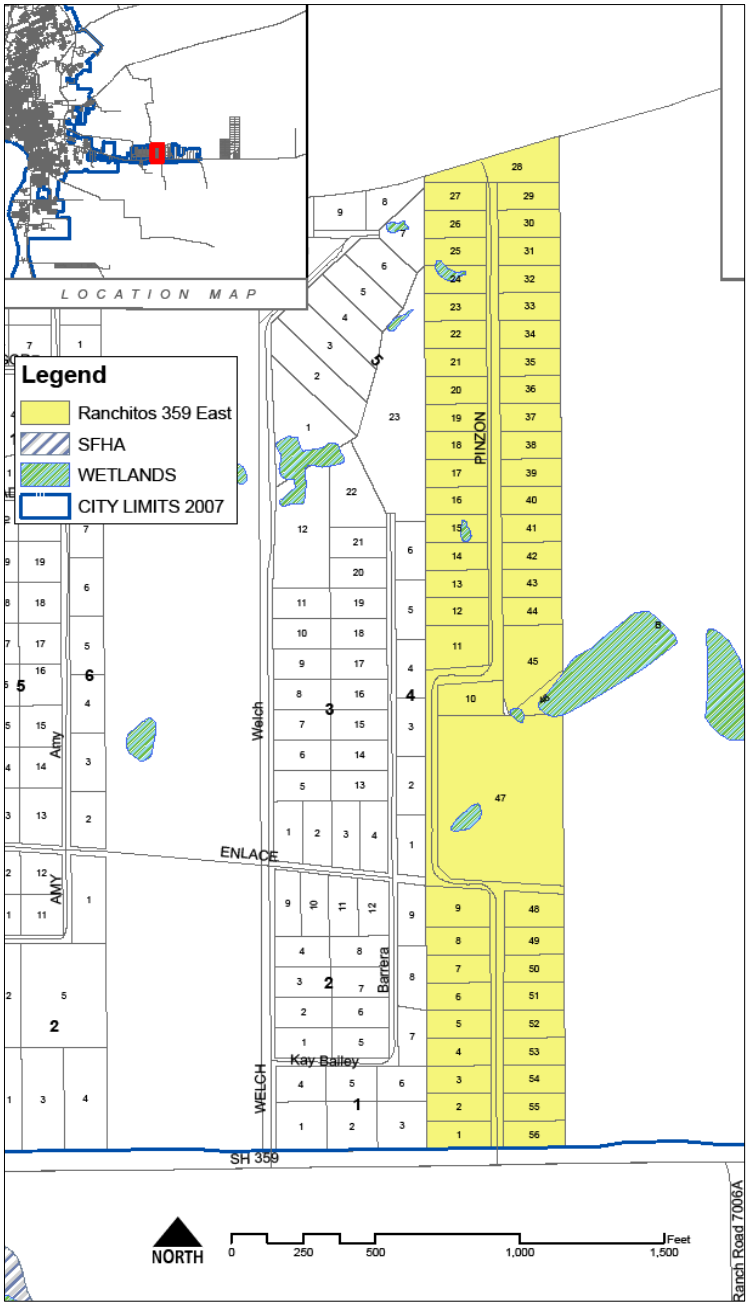
Empty Lot	Industrial
Abandoned structure	Ranchette
Residential	Junk Yard
Residential Complex	Truck Yard
Residential/Workshop	Institutional
Residential/Convenience Store	Religious
Commercial	

Fig 28. San Carlos II. Lot platting and uses

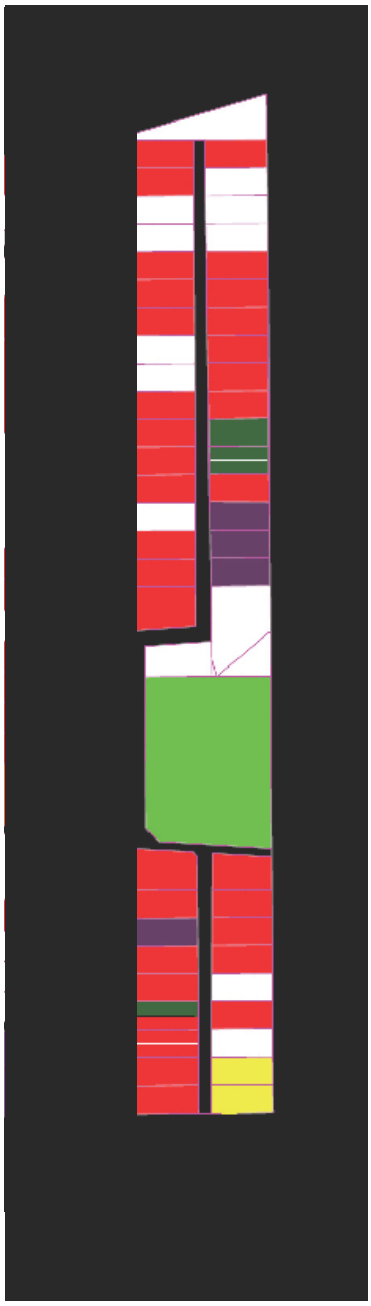
two small religious buildings. A small compound with a main residential structure and two campers also suggested an extended household or tenants. The presence of services was similar to San Carlos I: electricity poles were present and water was imported and stored by each household. Wastewater was managed with septic tanks or simple pit latrines. Streets were unpaved but had been just re-graded by the county at the time of the survey. The semi-rural aspect of San Carlos II was similar to San Carlos I due to the same reasons: a large amount of empty lots and absence of developed structures.

4.6.7 Ranchitos 359 East

Ranchitos 359 East was located next to San Carlos II and, in fact, Enlace St. connects with its only access street (Pinzon). Like the previous colonias, it was a strip of land between Highway 359 and the railroad tracks, similar in length although a little narrower than San Carlos II (3,700’ x 500’ approximately). Covering about 40 acres (37 according to AGT), Ranchitos 359 had 56 mostly residential lots. The exception was a meat market that occupied a front lot on Highway 359, and a small ranch divided the colonia into two halves. Lots were ½ acre (102’ x 213’) with the exception of some lots affected by floodable areas and the ranch. The slightly smaller proportion of empty lots (20%) and the higher visible density of built structures contributed to give a less rural appearance to Ranchitos 359. Some residential lots had been split into two smaller lots, and two adjacent lots had been joined to house a compound of several trailers, probably for either tenants or a large extended household. The only street and the visible services of Ranchitos 359 appeared similar to the other colonias (see figure 29).



Platting as of 2007 of Ranchitos 359 East
(source: Webb County, Planning Department)



Lot use based on survey

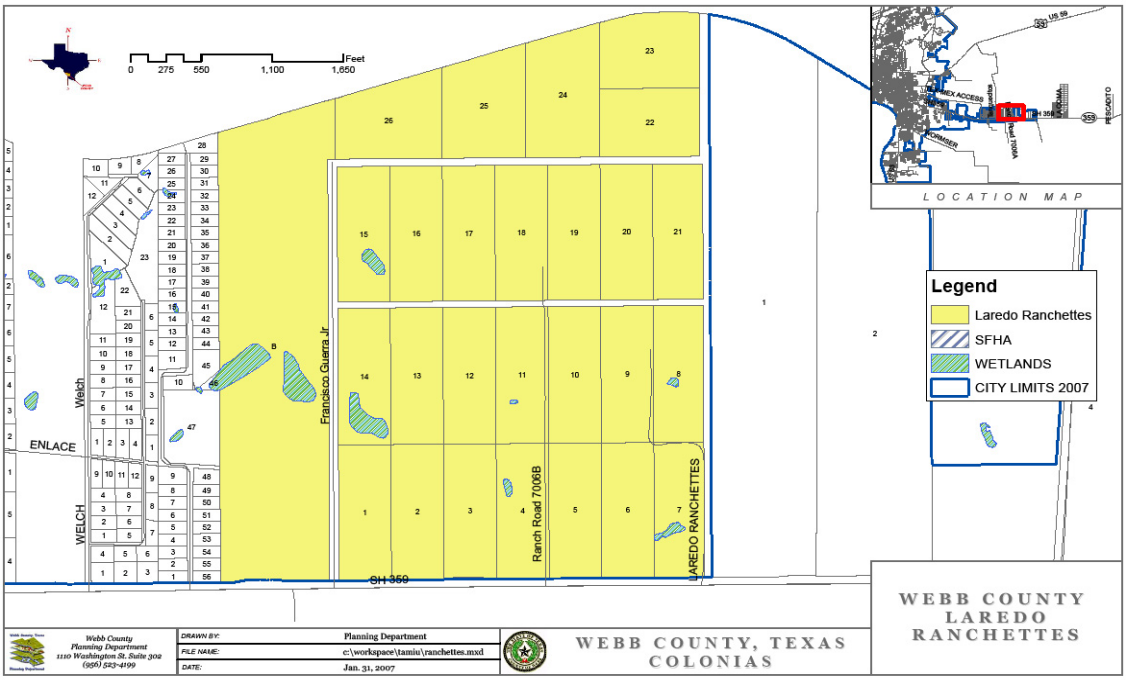
Lot use in Highway 359 colonias, Webb County, TX

- Empty Lot
- Abandoned structure
- Residential
- Residential Complex
- Residential/Workshop
- Residential/Convenience Store
- Commercial
- Industrial
- Ranchette
- Junk Yard
- Truck Yard
- Institutional
- Religious

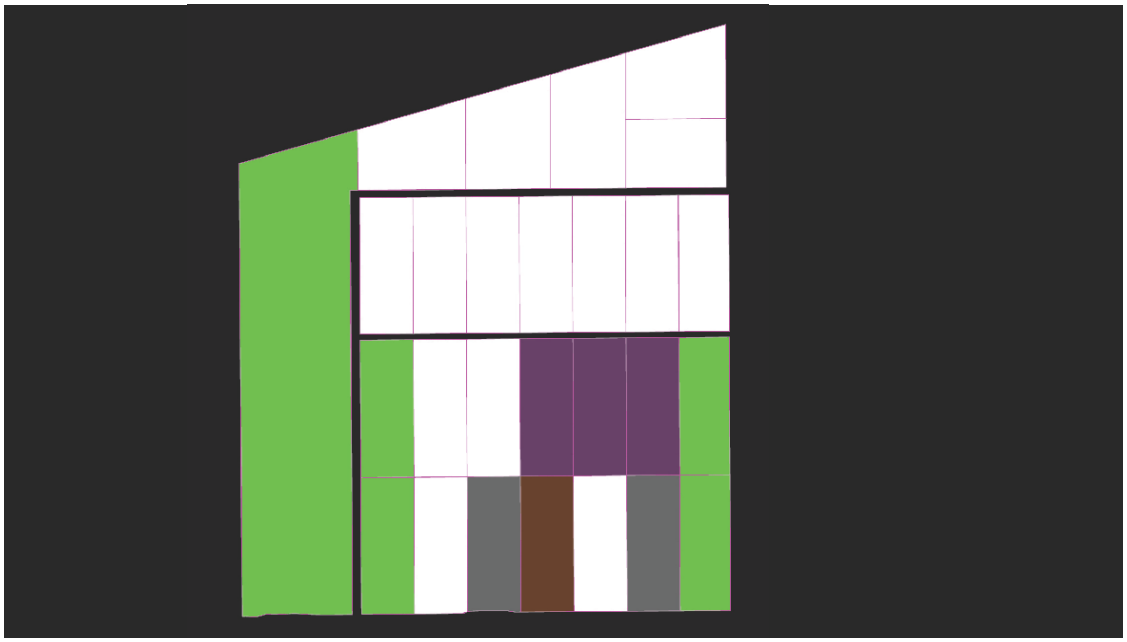
Fig 29. Ranchitos 359 East. Lot platting and uses

4.6.8 Laredo Ranchettes

Laredo Ranchetters followed Ranchitos 359 East. It was located approximately 4.27 miles from Larga Vista and it was the last in the sequence of the adjacent seven colonias that began with Tanquecitos II. It was also located to the north of Highway 359 and the south of the railroad tracks. West of Laredo Ranchettes was a vast portion of undeveloped large properties that contained small junk yards, truck shops, and some retail. Pueblo Nuevo and La Coma, the last two colonias studied, are located more than 3.5 miles east from Laredo Ranchettes. Laredo Ranchettes was radically different from all the previous colonias described above. As its names indicated, it was land subdivided into small ranches whose initial purpose may have been to have rural parcels close to the city . It was approximately 365 acres (442 according to AGT) divided into only 26 lots. Most of the lots were 12 acres (450’ x 1150’) and a few were even larger. Half of the ranches were empty. Of the other half, only nine had people living in structures scattered on the lots, making Laredo Ranchettes appear uninhabited. There were two streets providing access into the colonia (Francisco Guerra Jr. and Laredo Ranchettes). These streets were connected by two other unnamed streets. Some lots had been subdivided by fences into smaller lots. Electricity lines visibly reached the few structures. Streets were unpaved and eroded, water was imported and stored in ad hoc containers and tanks, and wastewater was handled with septic tanks. Laredo Ranchettes’ inhabited lots were composed of small complexes of structures, some were residential, some were bird and chicken cages, sheds, fenced corrals, and porches. The low density, rural character, made Laredo Ranchettes appear different to the denser colonias (see figure 30).



Platting as of 2007 of Ranchettes (source: Webb County, Planning Department)



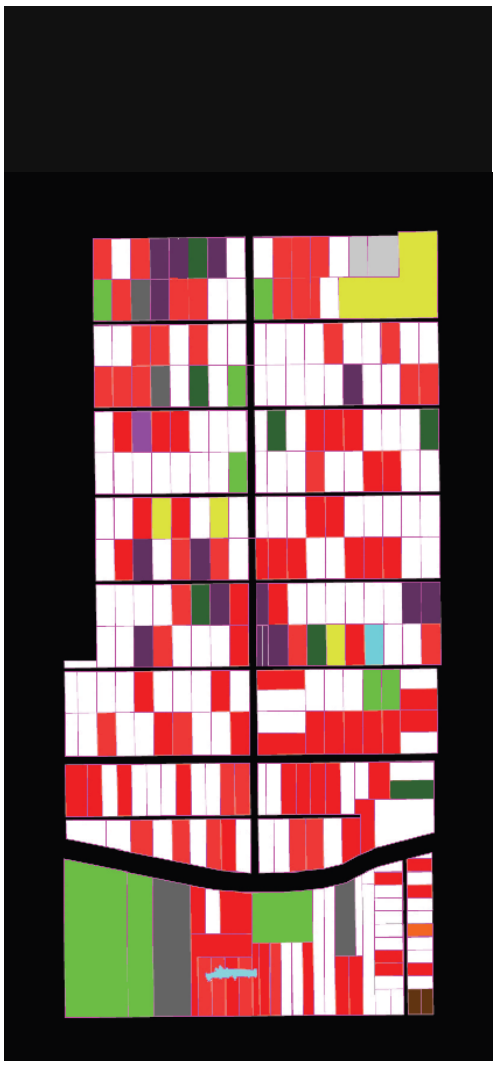
Lot use based on survey

Lot use in Highway 359 colonias, Webb County, TX

Empty Lot	Industrial
Abandoned structure	Ranchette
Residential	Junk Yard
Residential Complex	Truck Yard
Residential/Workshop	Institutional
Residential/Convenience Store	Religious
Commercial	

Fig 30. Ranchettes. Lot platting and uses

Platting as of 2007 of Pueblo Nuevo
(source: Webb County, Planning Department)



Lot use based on survey

Lot use in Highway 359 colonias, Webb County, TX

- Empty Lot
- Abandoned structure
- Residential
- Residential Complex
- Residential/Workshop
- Residential/Convenience Store
- Commercial
- Industrial
- Ranchette
- Junk Yard
- Truck Yard
- Institutional
- Religious

Fig 31. Pueblo Nuevo. Lot platting and uses

4.6.9 Pueblo Nuevo

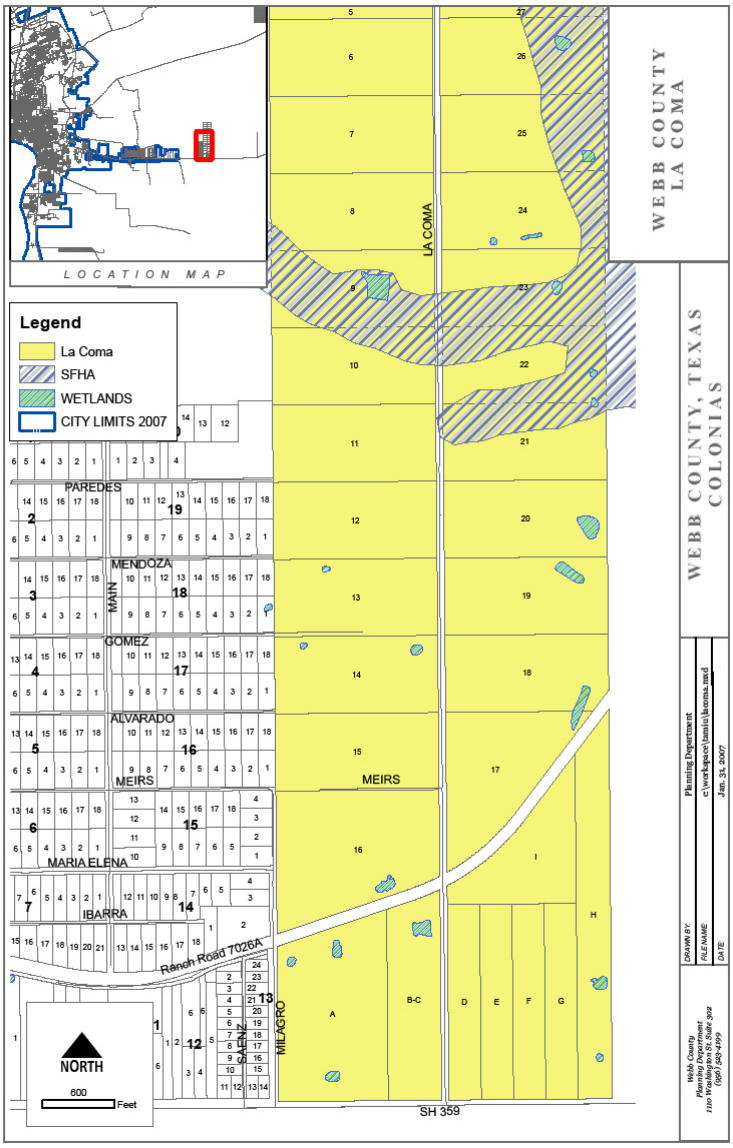
Pueblo Nuevo is almost 8 miles from Larga Vista. Pueblo Nuevo contains a high concentration of residential lots hidden behind a strip of long lots between Highway 359 and the railroad tracks. Pueblo Nuevo had 304 one-acre lots in a total of 352 acres that included streets (369 according to AGT). The land tract extended for almost ½ mile in width along Highway 359 and more than a mile north in length. The colonia layout followed a fishbone pattern with a central street (Main) intersected by a road that runs parallel to the railroad track (Ranch Road 7026A) and eight secondary streets (Ibarra, Maria Elena, Meirs, Alvarado, Gomez, Mendoza, Paredes, and Ozuna). The main access to Pueblo Nuevo was by a single street at the east side of the colonia (Milagro) that connected to the road and two of the secondary streets. Pueblo Nuevo had the biggest percentage of empty lots (45%) and the great majority of the occupied lots were residential, including most of the lots adjacent to Highway 359 (see figure 31). In fact, other than residential structures, there were only three junk yards, one truck yard, one small industry, one convenience store, and one religious building. The character of Pueblo Nuevo was muddled. Some of the lots that were closer to the access street were more developed and have more consolidated structures, while in several of the farthest lots, it was more common to see smaller structures in the process of being added onto and completed. Pueblo Nuevo also had the highest number of abandoned structures (8). But it was the isolation and size of the colonia, and the proportion of unoccupied lots that gave Pueblo Nuevo a more rural character. Some activities that reflected this character were small crops of corn, chickens and goats raised in others. The large lots

also allow for more than one household and, although formal subdivision was only observed in two lots by fenced limits, it was common to see five or more main structures on lots, suggesting the presence of extended households or tenants. Despite its greater distance from Laredo, utility services were similar to the previous colonias. Some less consolidated lots use outhouses and pit latrines.

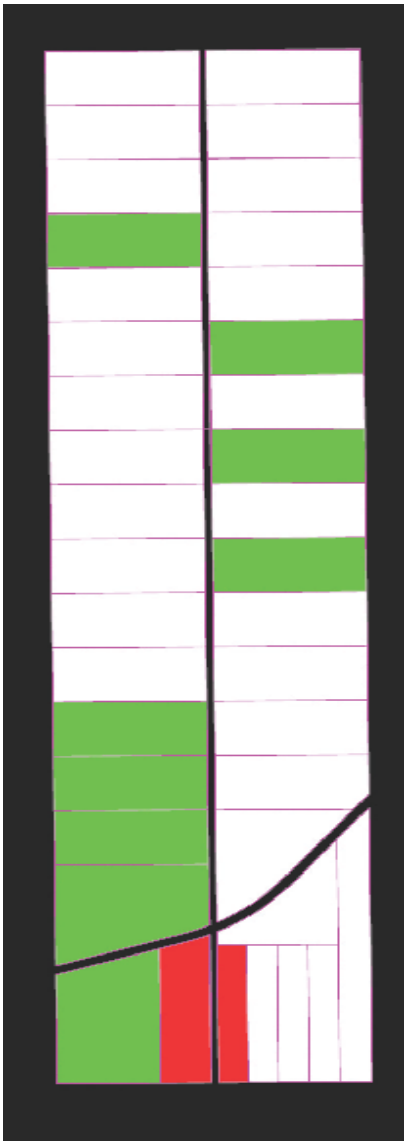
4.6.10 La Coma

La Coma was the largest colonia, more than 8 miles from Larga Vista. It had an area of 785 acres (777 according to AGT) in a rectangular tract of land that ran half a mile on Highway 359 and extended 2.31 miles to the north. There were 39 ranches of about 20 acres each (645' x 1350'). Like all the previous colonias, the land between Highway 359 and the railroad tracks had long, narrow lots facing the highway, of which only a few were occupied. The great majority of the lots (27) were unoccupied and no even cleared, although many fenced with barbed wire. Less than a quarter of the lots were used as recreational retreats for weekends or holidays. The presence of fences, gates, internal roads, cleared and clean open areas, covered porches, and playgrounds suggested this occasional use. Only one of the lots closer to Highway 359 was used as a residence with several housing structures on it. These structures were built in separate sub-lots and the survey later showed that many of these households were unrelated. This suggested that private arrangements were occurring between the lot owner and the different households that included the unregistered sale of parcels. All structures had connections to the electricity lines that were present in the colonia. Streets were graded

dirt, severely eroded by rainwater. Considering that Pueblo Nuevo streets had just been re-graded, the low population of La Coma probably made it less of a priority than the other colonias for county services. Water and wastewater were also managed like in the other colonias. The character of La Coma was mixed. While the inhabited lot on La Coma seemed like a developing subdivision, the rest of the colonia was clearly rural, with very little activity going on (see figure 32).



Platting as of 2007 of La Coma
(source: Webb County, Planning Department)



Lot use based on survey

Lot use in Highway 359 colonias, Webb County, TX

Empty Lot	Industrial
Abandoned structure	Ranchette
Residential	Junk Yard
Residential Complex	Truck Yard
Residential/Workshop	Institutional
Residential/Convenience Store	Religious
Commercial	

Fig 32. La Coma. Lot platting and uses

5. DATA ANALYSIS

This section presents and analyzes the data collected and discusses general and specific findings on house form and households. The first objective of the analysis is to reconstruct the process of diversification and consolidation of the house form. The analysis related to the house forms includes consideration of land use and lot characteristics, identification of incremental construction, house form types, and changes during various stages of construction in all the colonias surveyed. Next, households' demographics, characteristics, structure, and change over time are analyzed. Relationships between house form and household are then explored by studying correlations between the analyzed variables. The section closes with a presentation and of representative examples of the housing and household diversity found in the study.

5.1 Preliminary Findings

Analysis of aerial imagery offered the first long-term picture of how our case study colonias had grown throughout the years. As mentioned in the previous section, availability of aerial imagery of the case studies at several times during the last 23 years was a key element in the selection of colonias. These sequenced aerial photographs of the selected colonias spanning from 1983 to 2005, were obtained from varied sources (Texas A&M International University library, the US Geological Survey, and the Webb County Appraisal District Office) (1983-84, 1985, 1991, 1994-95, 2002, and 2005). The photographs were analyzed to determine different stages of housing development and to

Steps of Analysis:
A-Colonia sector
B- Identification of roofed structures on aerial image
C- Identification of lot limits on platting map
D- Overlay of lot limits on aerial image
E- Overlay of roofed structures and lot limits on aerial maps

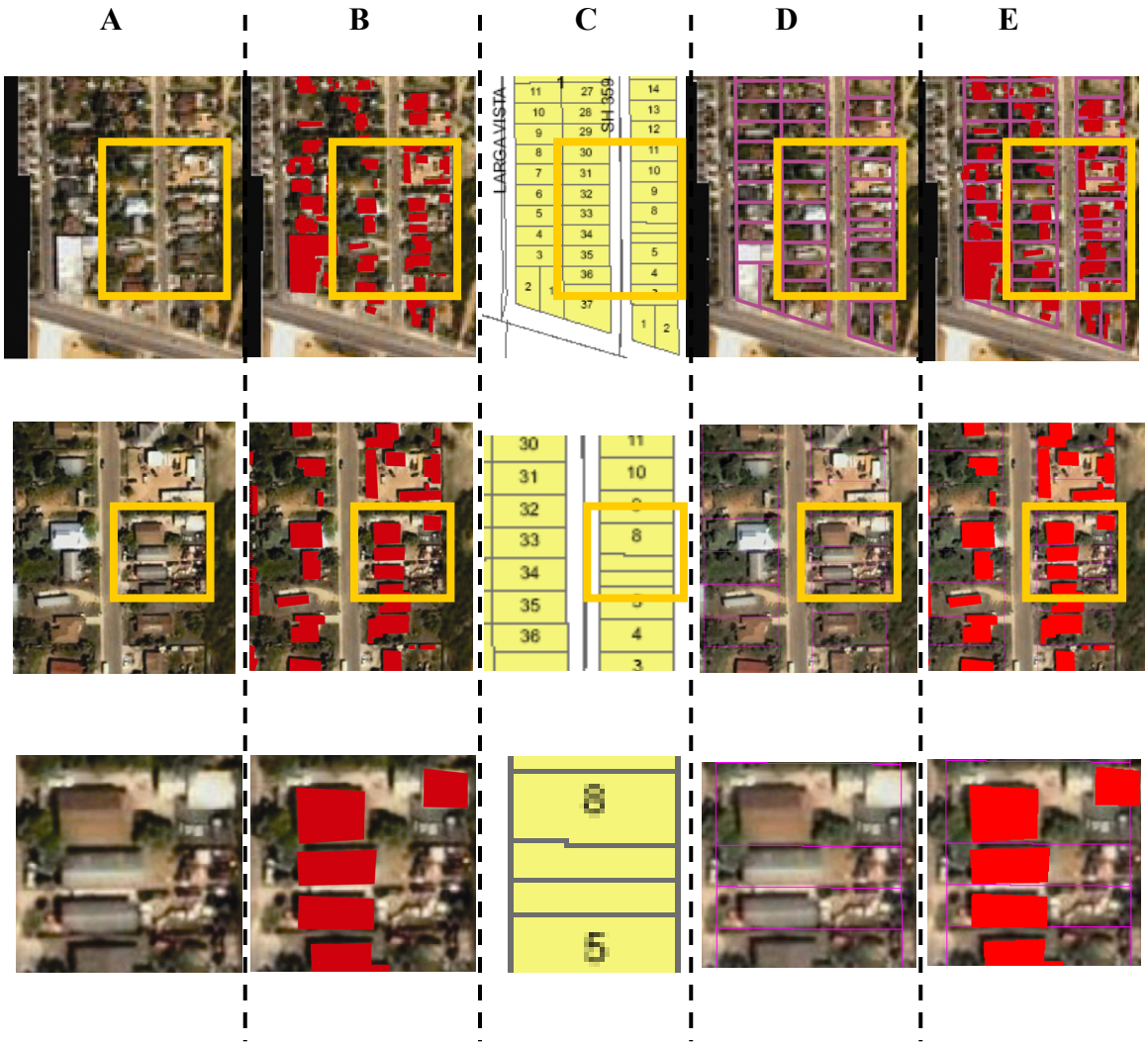


Fig 33. Example of analysis of the aerial imagery (Source: Web County Appraisal District)

generate a preliminary classification of colonias' house form. Images of the colonias had a resolution of up to one foot per pixel (approx. 1:864), which provided enough information to differentiate house form changes. Plot characteristics including plot area and dimensions, and house form characteristics (type, number and arrangement of structures in the lot, and covered area of the structures) were determined and analyzed. The researcher is familiar with simple aerial image interpretation and has used similar data and analysis methods on previous studies of low-income settlements in developing countries (Reimers, 1992; Reimers and Portela, 1996).

Combining the platting maps of the colonias provided by the Webb County Planning Department and their aerial images, a clear definition of the structures built within the limits of individual plots was obtained for each colonia (see figures 33 and 34). Built-up area for all the covered structures in each colonia at the different times were then calculated and compared as shown in figure 35. Since growth in each colonia varied depending on the number of lots and the specific characteristics of each colonia, the total area of all colonias at different times is shown as an indicator of the general growth for all the studied colonias (see figure 36).

Beyond this overall approach to colonias growth, analysis of house form became difficult in the preliminary stages due to the limitations of aerial imagery. Determining the diversity of colonias' house form by examining images of the roofs of built structures opened great room of speculation. It was possible to differentiate structures by their size and whether or not successive structures were detached or attached from the previous ones, but there were serious limitations to going beyond these basic features.

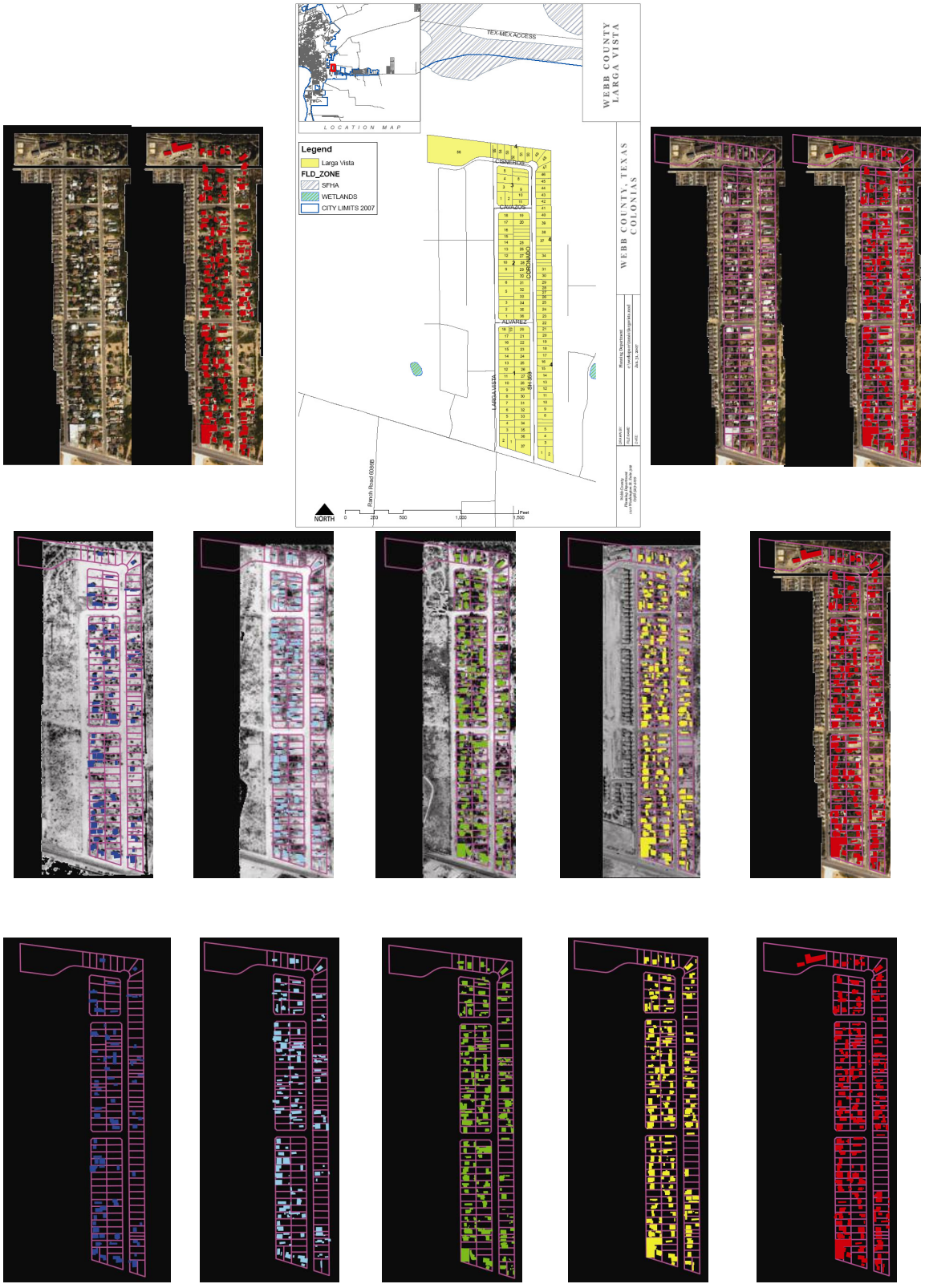


Fig 34. Example of preliminary analysis for one of the sample colonias (Larga Vista). Use of maps and aerial images for analysis of built up area increase throughout time.

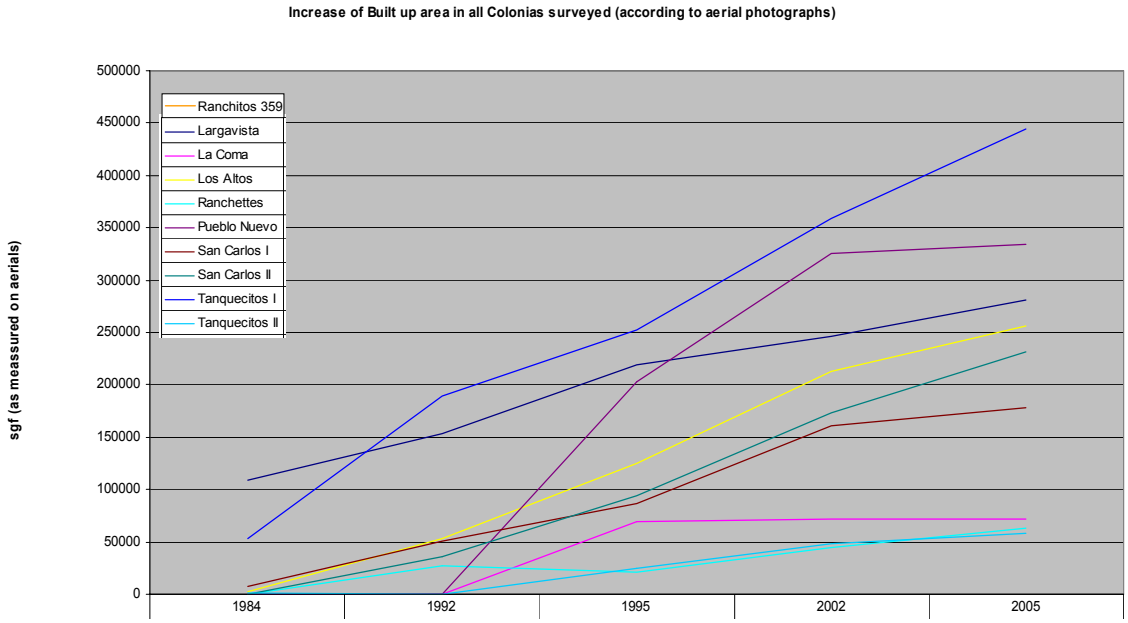


Fig 35. Increase of built up area on colonias selected according to aerials.

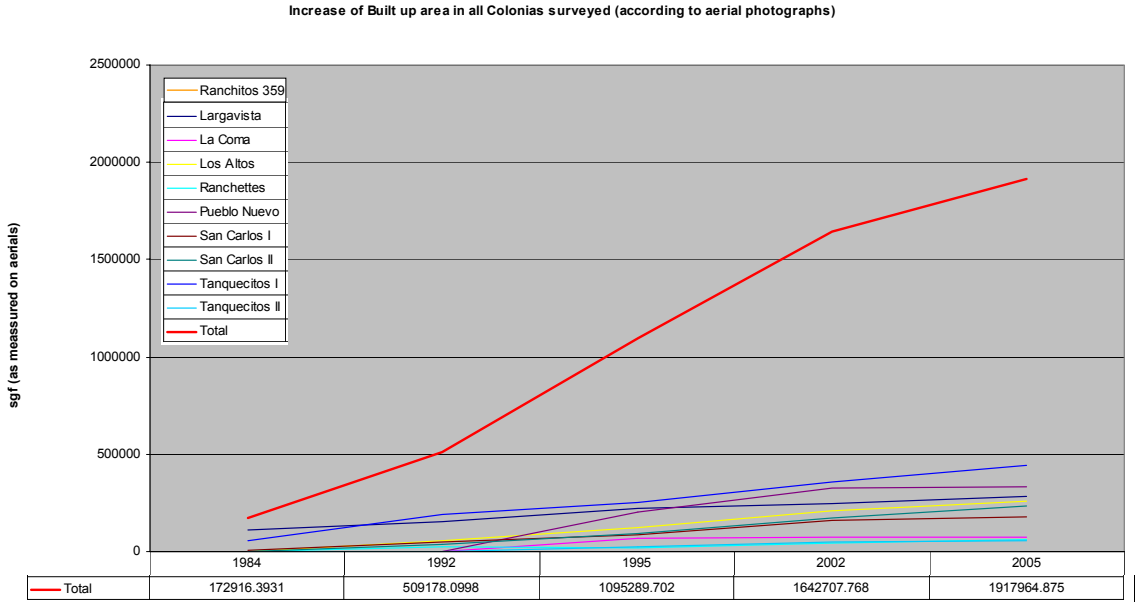


Fig 36. Added built up area for all colonias surveyed according to aerials.

Even the more familiar and distinguishable shapes, such as those of trailers and manufactured houses (evidenced by their standard dimensions), were very similar to large structures built on site with approximate similar dimensions. Any possible classification, thus, proved to be too simplistic and likely to overlook several physical aspects of the housing that were later observed in the survey visits to the site. These limitations were important considerations in deciding to survey a random sample of lots on each of the colonias to observe housing.

The random sample was generated by assigning numbers to each of the lots shown in the maps provided by the county. Then, using a random number generator, a random sequence for each colonia was produced and the first 15% of each sequence was selected to be interviewed for a total of 160 lots for all colonias. Aerial sequences of the selected lots were generated and provided as part of the surveying material to support household interviews (see figure 37). From the original 160 lots selected, 113 households were interviewed, 4 were abandoned structures, 26 never answered the several interview attempts, and 17 households explicitly denied the survey (7 of which were renters). In an effort to interview a number of households close to the original size of the sample, 10 new lots next on the random sequences were selected to be interviewed. Aerial sequences were produced for these new lots. Advisors to the principal researcher raised legitimate concerns about the possible bias generated by substituting the unattended interview requests. It was resolved to make separate analyses of the lots included in the original random sample and the 10 new lots.

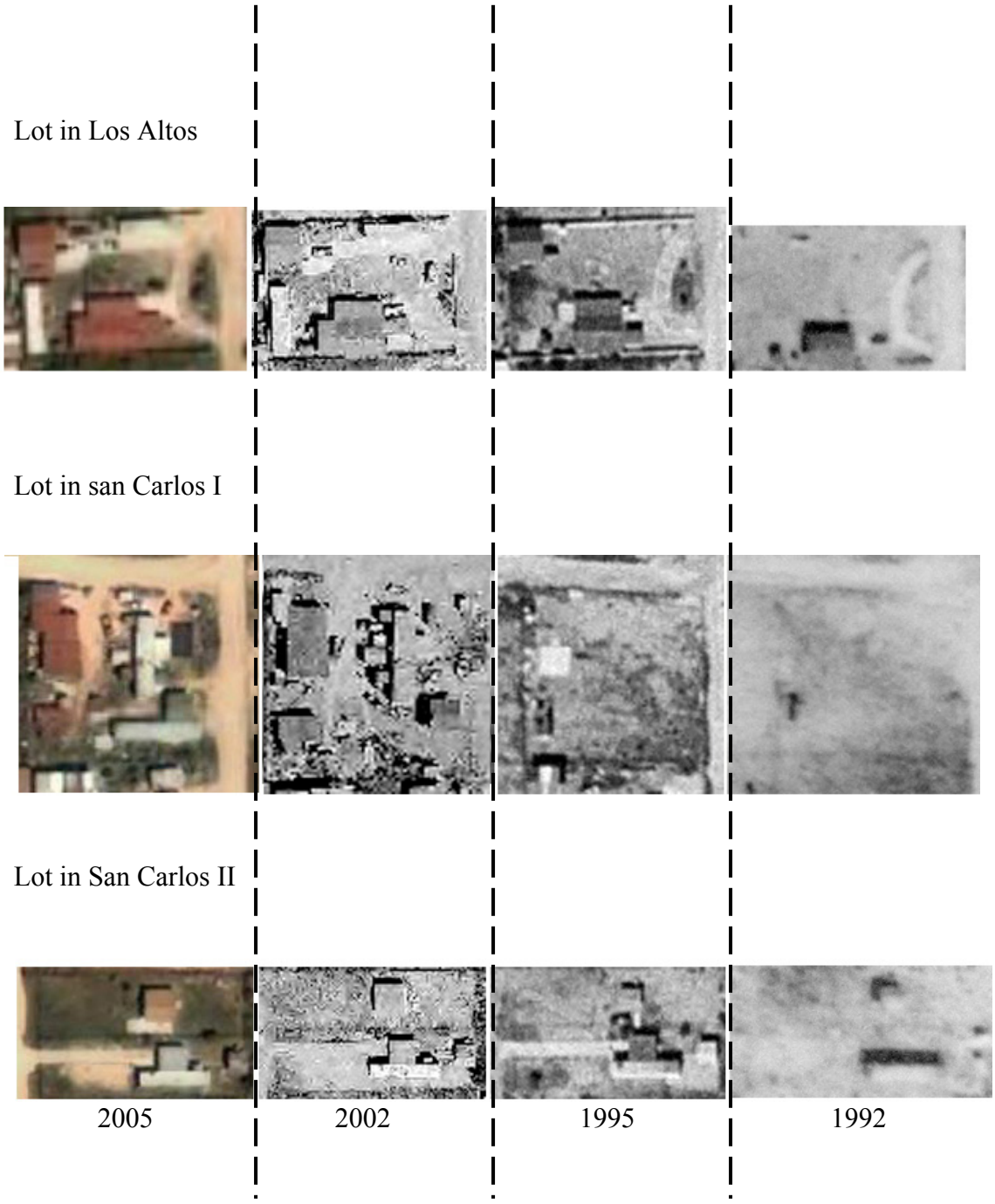


Fig 37. Examples of aerial sequences of lots used in the field survey.

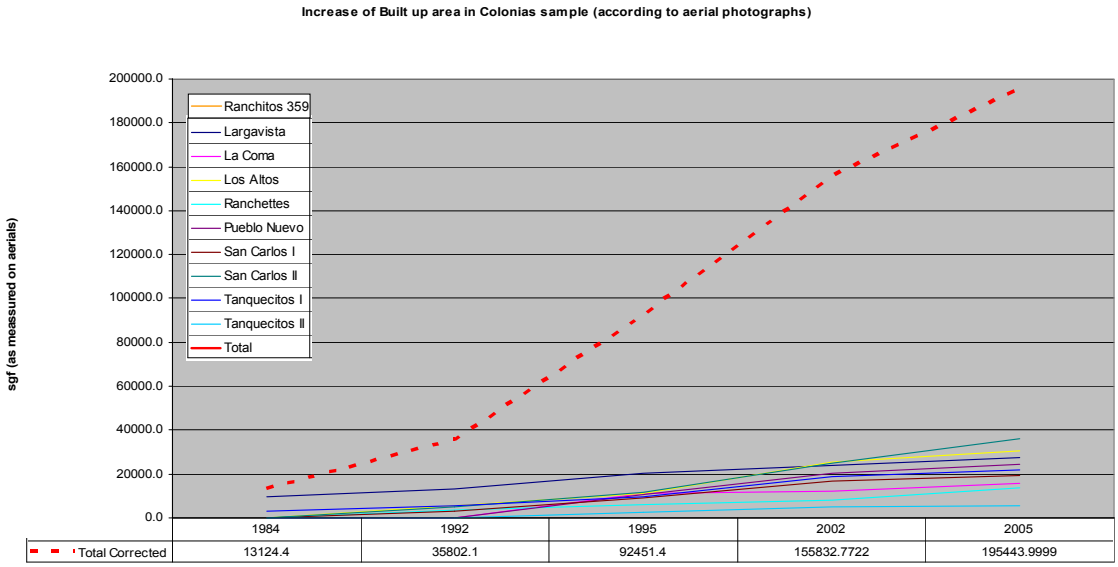


Fig 38. Built up area growth for surveyed lots according to aerials images.

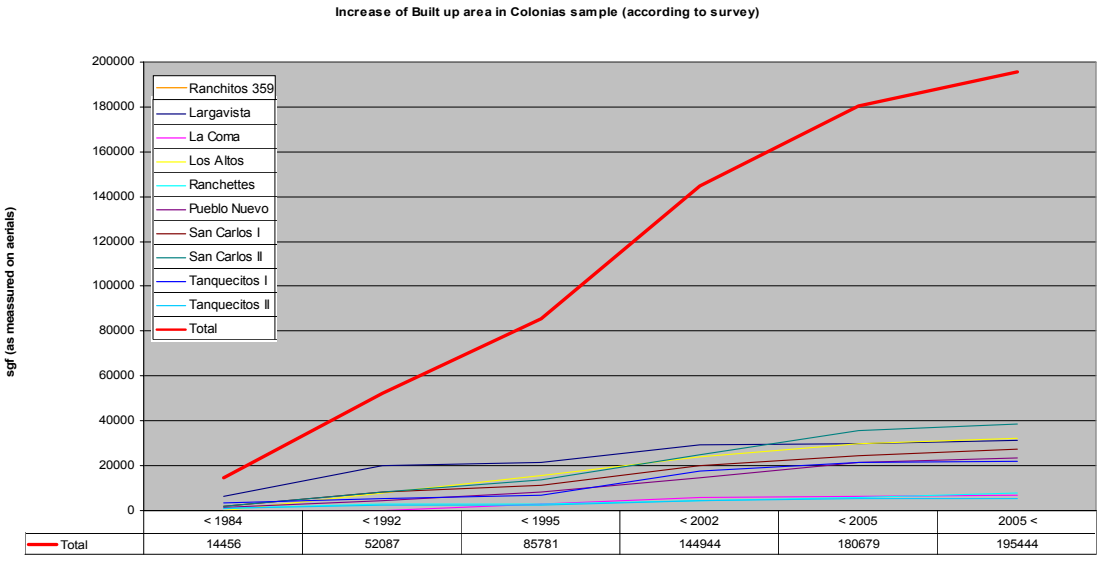


Fig 39. Built up area growth for surveyed lots according to field survey.

The results showed no apparent differences between these groups probably because the number of new lots represented 8.13% of the total sample. Thus, findings are here presented for the 123 interviewed households.

With the completion of the household surveys, a more accurate description of the growth of built-up area was obtained and a clear picture of how the structures were developed on the lot. This new analysis was compared with our preliminary analysis of area increase according to the aerial photographs, but only for the sampled lots. Both charts described a very similar increase of the built-up area, thus validating our preliminary findings about colonias growth. (see figures 38 and 39)

5.2 Analysis on House Form

The analysis of house form characteristics and change was an exploration into understanding colonias' housing production. The objective was identifying patterns of growth and consolidation of the house form by looking at the characteristics of the housing produced in colonias over time.

The interview provided a wealth of information helping to identify relevant indicators that best described house form characteristics and change over time. The size of the lots and their use on each colonia were the first aspects to be analyzed. Next we analyzed the characteristics of incremental housing construction, which in turn informed the descriptive analysis of house forms and house form changes associated with each of the stages of construction. Finally, the relationships between time taken on each incremental stage and type of house form change were explored.

5.2.1 Land Use and Lot Characteristics

The analysis of aerial imagery was complemented by preliminary field visits to each colonia. These visits provided detailed information about the range of house form types and uses given to lots. Maps of lot use were produced for each of the colonias studied. Further changes to the physical configuration of the initial lot were identified and analyzed. These findings are summarized in table IV. It was, however, the household interviews what revealed the actual range of improvements that households performed on their housing structures over time.

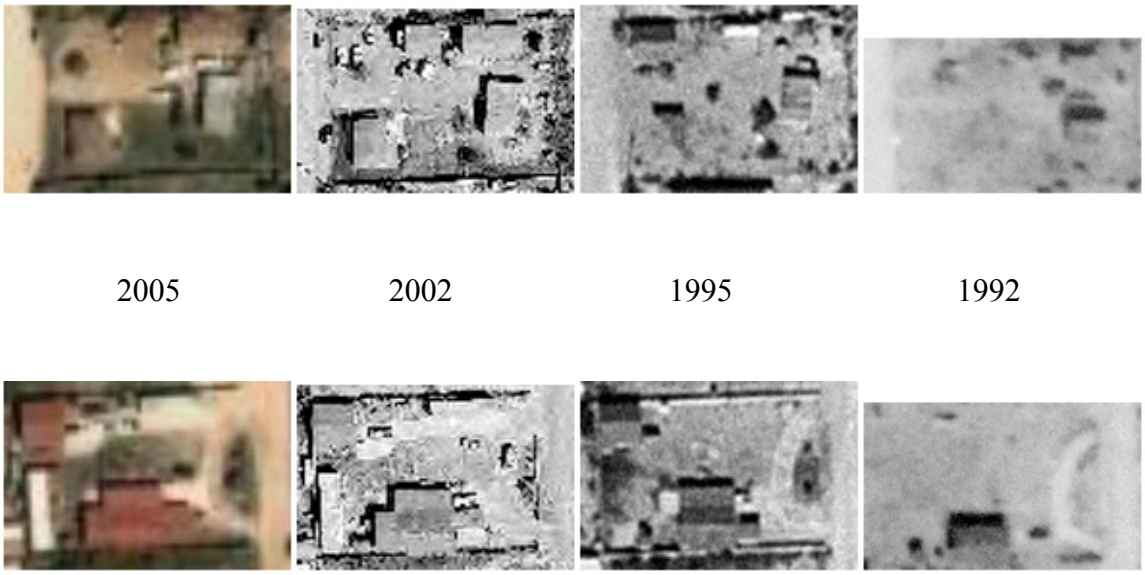
Several lots had more than one household evidenced by the construction of two or more main structures –as opposed to secondary structures– arranged in different parts of the lot, usually sharing some common areas (such as driveways or patios) and services (such as laundry areas or outhouses). These residential compounds or clusters showed no clear separation between households beyond the presence of differentiable housing structures. Unlike house forms composed of a main structure and several smaller ones, structures in these clusters were bigger than just detached rooms or secondary premises and showed autonomy that allowed their identifications as separate households.

The interviews confirmed that these residential clusters were usually owned by one of the households while secondary households inhabited the other structures. The interviews also showed that these lots corresponded to extended families, households with relatives who shared land and services. Some lots observed during the fieldwork were occupied by several households living in separate structures whom identified themselves as tenants. However, the owner did not live on any of the premises (see figure 40). None of these households were willing to complete the interview.

Table IV. Classification of lot use and characteristics in surveyed colonias.

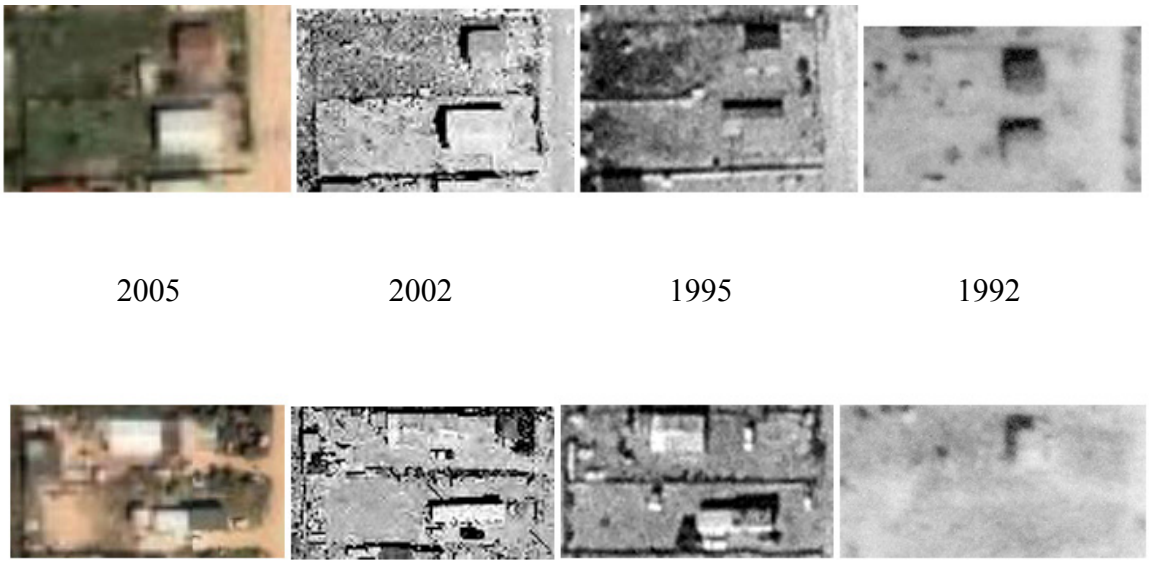
Colonia	Larga Vista	Los Altos	Tanquecitos I	Tanquecitos II	San Carlos I	San Carlos II	Ranchitos 359	Ranchettes	Pueblo Nuevo	La Coma	Total
Empty lot	10	18	34	5	28	18	15	16	152	28	**323**
Abandoned	0	5	1	1	1	3	0	0	8	0	**19**
Ranch	0	0	1	2	0	2	0	1	6	9	**21**
Residential single	122	44	33	6	39	21	31	4	113	1	**414**
Lot divided into 2 residential sub-lots	0	11	5	0	2	10	4	0	2	0	**35**
Lot divided into 3 residential sub-lots	0	2	2	0	4	1	0	0	0	0	**9**
Lot divided into 4+ residential sub-lots	0	0	0	0	1	1	0	3	0	1	**6**
Residential compound	0	5	2	4	8	0	4	0	13	0	**36**
House/Workshop	1	2	0	2	6	1	0	0	0	0	**12**
House/Convenience Store	1	1	0	0	0	1	0	0	2	0	**5**
Commercial	0	0	2	1	0	0	2	0	0	0	**8**
Industrial	1	5	12	3	2	0	0	1	1	0	**24**
Truck Yard	1	0	5	0	1	2	0	0	3	0	**11**
Junk Yard/Service	1	1	13	5	6	0	0	2	3	0	**31**
Religious	0	2	1	0	0	2	0	0	1	0	**6**
Institutional + Services	2	0	0	0	0	0	0	0	0	0	**2**
Total	**140**	**96**	**95**	**29**	**98**	**62**	**56**	**26**	**291**	**39**	**962**

Other households shared a lot by subdividing it into two, three, four and more smaller lots, each containing a separated housing structure. These smaller subdivided lots had clear boundaries defined by fences, walls, or vegetation such as shrubs or small trees. Often, just the way land was cleared or simple pathways along the perimeter marked the separation between these smaller properties (see figure 41). The subdivision of lots reflected a horizontal relationship between the households. They shared the property communally but divided it proportionally to their financial share of the purchase, services and maintenance. Complicating this arrangement is the fact that subdividing residential lots in colonias is prohibited by legislation and therefore platting maps did not reflect these subdivisions.



2005 2002 1995 1992

Fig 40. Examples of lots with housing compounds or clusters.
Notice the presence of more than one structure in the lot in a cluster arrangement.



2005 2002 1995 1992

Fig 41. Examples of subdivided lots.
Notice that the original lot has been clearly subdivided into two smaller lots.

Thus, formal registration of these sub-lots did not exist and the lot was registered at the name of one of the households. Some of the households interviewed explained that ownership on these subdivisions was reflected in private agreements. For this reason, selling sub-lots separately was not legal. The survey showed that households linked by blood (brothers or sisters) and their spouses or partners shared these lots.

5.2.2 Description of Land Uses

Of the 962 lots, 323 (33.6%) had no visible structures or signs of previous building activity, 19 lots (2%) had empty structures that were clearly abandoned and in the process of deterioration, and the remaining 620 lots (64.4%) were occupied. The unoccupied lots made up a third of the total, but were scattered throughout the colonias without a specific pattern. Some were fenced and cleared lots located between lots with buildings. Some were blocks of two, three or more overgrown lots simply delimited by a rusted barbed wire fence. It would take further investigation of public records to identify the owners of these empty lots. Neighbors often did not know who the owners of these lots were and they believed that the main purpose of keeping land unoccupied was speculation. This is a common practice in other settlements with characteristics similar to colonias. This was not an uncommon image. In Latin America, this practice is called *engordar tierra* or "fattening land." It implies benefiting from the process of land revalorization obtained from the progressive improvement of the conditions of the settlement. As housing consolidates and services and facilities are provided, land value increases.

A majority of the lots studied were used exclusively for residential purposes. Although residential lots accounted for only half of the total number of lots, they represented 80.7% of the occupied lots. Notably, even though most residential lots had a single main structure, 86 lots had more than one main structure (13.8% of residential lots). In most of these (50 lots), the initial lot was subdivided into 2 or more lots, resulting in 71 additional lots, for a total of 1033 lots and sub-divided lots in all ten colonias. Each of these subdivided lots had a main structure that was occupied by a separate household. These cases reflected ownership originally by a relative who purchased or inherited a lot and then subdivided it into smaller sub-lots, also sharing services and other expenses. An additional 36 lots were residential compounds or clusters of more than one main structure inhabited by separate households. The survey showed that these compounds had actually a main household living in one of the structures and have permitted another household (usually a relative) to set another structure to live in on a temporary basis, or rented to tenants.

Twenty one lots in the colonias furthest from Laredo were classified as ranches. These were large lots that showed evidence of occupation, although no daily activity. Structures in these lots were mainly covered open areas, playgrounds, barbecue pits, sleeping quarters or, recreational structures. Interviewed households asked about these lots reported that owners came during weekend and holidays to spend one or two days. Some of these ranches were cleared, well maintained, and even cultivated with small crops or planted with trees.

Seventeen residential lots were also used to develop some type of productive activity, (such as convenience stores and hairdressing saloons) or workshops (blacksmiths and welding shops). Thirty three lots were not residential at all but were used for retail or industrial economic activities. Finally, eight lots were used to house community facilities and services. Some of them were owned by the county, such as the community center and a water facility installed by the county –to refill tanks and drums hauled by the residents– at Larga Vista. Others services were privately owned and managed and included mainly religious buildings.

5.2.3 Incremental Construction of Housing

Perhaps one of the most important findings of this study confirms the idea that colonias, like other low-income settlements, are built in successive, incremental, differentiable stages. Our survey revealed that, from the time an initial structure was built or set on the lot to the present state of construction, households were able to differentiate up to 10 relevant successive stages in which they built and completed their current structures (see figures A1, A2, A3, A4 and A5 in Appendix A). As defined by the household, a stage was a relevant change made to the house form that had been executed according to preconceived plan and within a determined period of time. Stages were usually separated by periods of low or no construction activity. The changes described were as diverse as increasing the amount of roofed or enclosed area of the house form, making qualitative improvements such as adding floor and wall finishings, or renewing deteriorated parts of the building.

In terms of time used to complete each stage, the 1st stage was mostly completed within one year of acquiring the land. In fact, almost 45% completed the 1st stage at once and another 49% before the end of the 1st year. The remaining 6% of the households took 2 to 6 years to built the first house form (see figure A1). After that, less than 15% completed the 2nd stage within one year after completing the 1st. Almost 27% of the households took one year, 14% took two years, and 24% three to five years. The remaining 20% took between 6 to 18 years after the 1st stage to complete the 2nd stage (see figure A1). An even smaller proportion of households (8%) built a 3rd stage within one year after the second. Most built a 3rd stage in one to two years (48%) and three to five years (23%). The remaining 22% took between 6 to 18 years to complete the 3rd stage (see figure A2). Similarly, about 15% of the households who built a 4th stage completed it within one year of the previous. Around 47% took 2 or 4 years and almost 38% took from 3 to 18 years (see figure A2). Stages 5th and 6th have a similar low proportion completing the stages within one year (6% to 10%), most being completed in 1 to 3 years (64% to 73%), and a smaller proportion in 4 years or more (20% to 25%) (see figure A3). For stages 7th to 10th, most took between 1 to 3 years (62% or greater) (see figures A4 and A5).

In summary, 19% of the households built houses in two stages or less. Most of them (68%) went through three to six stages to reach the present house form. A small group (13%) went through seven stages or more to reach the present condition. The dominant finding was that residents took 3 to 5 stages to build their houses. This is an essential finding as it relates to the nature of colonias' house forms (see figure 42).

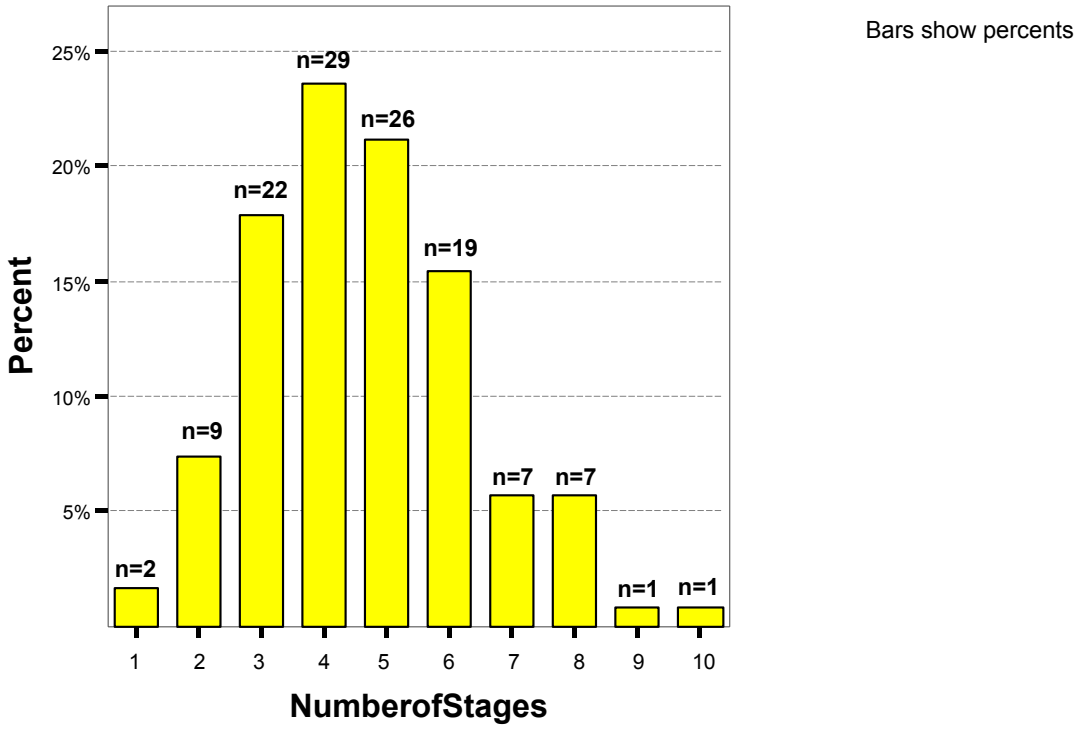


Fig 42. Number of stages to complete the current house form per lot

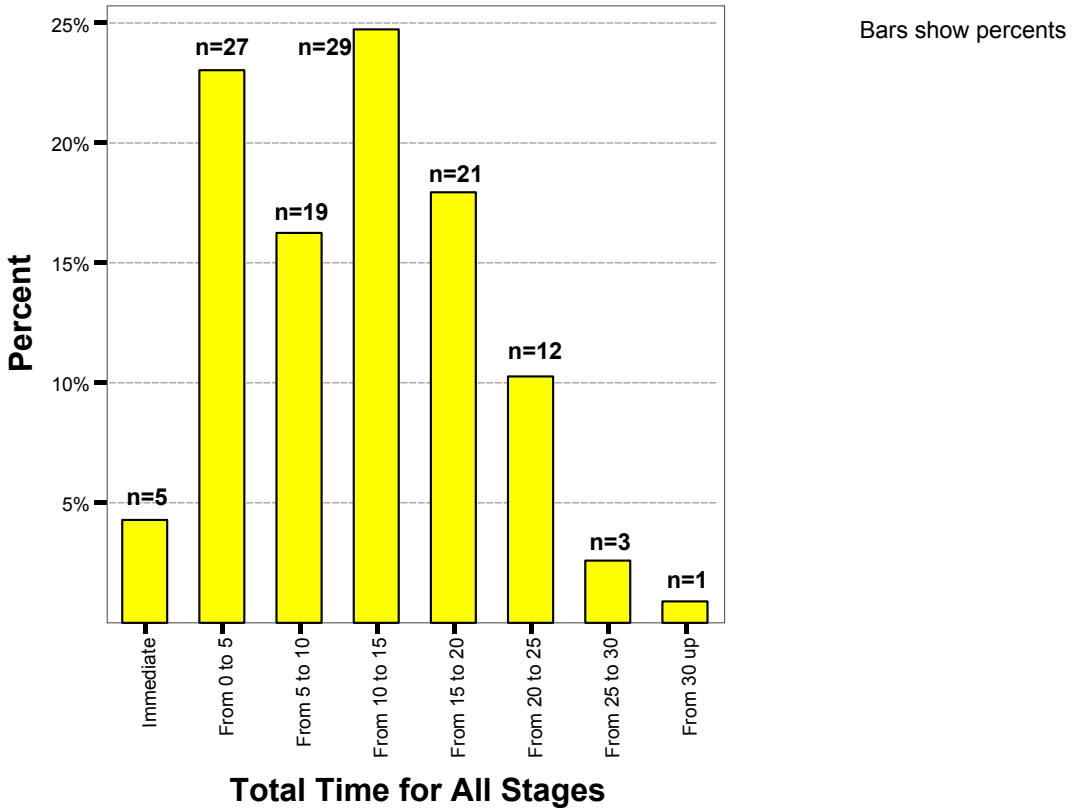


Fig 43. Total time to complete the current house form per lot (years).

The time taken on each stage varied among households. Most of the households completed the first stage rapidly. However, succeeding stages took longer, ranging from a median of 3.27 years for the second stage, 3 years for the third stage, and 2.35 years for the fourth stage (see table V). After that, the remaining stages reduced considerably the time to be completed with means of 1.09 years for the fifth stage, 0.67 for the sixth, 0.54 for the seventh, 0.16 for the eight, 0.49 for the ninth, and 0.16 for the last stage.

Table V. Time taken to complete construction on each stage

	1 stage	**2 stage**	**3 stage**	**4 stage**	**5 stage**	**6 stage**	**7 stage**	**8 stage**	**9 stage**	**10stage**
Mean (years)	0.42	3.27	3.00	2.35	1.09	0.67	0.54	0.16	0.49	0.16
Median (years)	0.04	2.00	2.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Std. Deviat. (years)	0.94	3.70	3.73	3.84	2.36	1.50	2.00	0.99	0.34	0.13
Minimum (years)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum (years)	6.00	18.00	18.00	18.00	15.00	7.00	17.00	10.00	3.00	1.00

The time taken for each household to complete all the stages was also variable. A minority of households built before or immediately after moving into the lot and a similar minority of households took more than 25 years to complete the structures on their lot. A more detailed analysis revealed that most households took between a few months up to 5 years (24%), and between 10 to 15 years (25%) to complete the current housing structures. A second cluster of households took between 5 and 10 years (16%) and 15 to 20 years (17%) to build their current structure. A third group of about 10% of households took between 20 to 25 years for their house structures to reach their present stage (see figure 43).

5.2.4 House Form Changes

A set of basic categories for house form changes derived from the preliminary observations of the aerial data and visits to the site were included in the survey instrument. These categories were used to describe the initial house form built (or set) on the site, and the subsequent types of changes made to the house form. These categories included whether the house form structure was of temporary or permanent character, and whether it was built or set on the site. Additional categories differentiated between finished structures (such as manufactured house, a trailer, or a camper) and unfinished house forms to be completed or added onto. Construction materials and use given to the spaces of the initial structures were also data that complemented house form information for the first stage. The subsequent stages identified the add-ons to the initial structure (attached or detached) or the improvements made to the house form (as described by the household). Thus, the final house form categories are reported here as they were described by the interviewees during the process of data collection. The categories presented below is a comprehensive inventory of the type of house form and house form changes that occurred as housing was progressively built and consolidated up to the moment in which this study was completed in the ten colonias studied. Table VI in the next page provides a summary of all the categories.

Temporary Structures

Temporary structures were defined as initial structures built to facilitate the arrival of the household to the lot, but later removed as more permanent structures were completed. Few households built temporary structures. Those that did described it as a provisional building which they first came to inhabit in the colonia.

Table VI. Summary of types of house form change

	House form Change	Description
Temporary	Temporary Structures	First roofs, rooms, shacks, etc. built on the lot as provisional residence
	Trailers, campers or mobile homes	Structures set or installed on the lot at any time of the house form development as provisional or permanent residence
Permanent house forms	Permanent Structures	Structures initially built on the lot or in replacement of temporary ones to serve as residence of the household
	Attached Additions	Permanent additions attached to existing structures (permanent or not) at any time of the house form development
	Second floor Additions	Permanent additions built on top of existing structures at any time of the house form development.
	Detached Structures	Independent permanent structures built at any time of the house form development
Need base improvements	Dividing or Extending Covered Space	Internal walls or partitions built under existing covered spaced to gain independence , privacy, etc.
	Installing or Building Water Tanks	Building water storage reservoirs for the household's consumption.
Aesthetic Improvements	Flooring	Finishing or refinishing already built floor slabs.
	Windows and Doors	Adding glass windows to existing openings or interior door to existing doorways.
	Improving exterior/interior finishing	Finishing or refinishing walls inside and outside of the house form to increase aesthetics of the house form
Exterior improvements	Building Uncovered Walls	Permanent walls and enclosures built in the open to be roofed later.
	Building Driveways/Ramps/Pathways	Construction of exterior pedestrian and vehicular paths to the houseform
	Corrals/Pig Pen/Chicken Cages	Building fences, enclosures, etc to keep and raise farm animals
	Fencing lots	Delimiting properties at any time
Repairing deteriorated elements	Kitchen Cabinets	Building new kitchen cabinetry to substitute the existing one.
	Replacing Existing Roofs	Replacing roofing materials of existing structures including trailers
	Building Roofs over Existing Trailer	Construction of roofs over existing trailers to increase rain protection and/or thermal performance

In some cases temporary structures were no more than a simple roof, with or without walls, to be used while clearing the land and settling into the lot. Some temporary structures were more elaborate (see figure 44) According to the interviewed households, they could include more than one space to separate day and night activities. but were eventually dismantled when the household moved into a permanent structure. Temporary structures were characteristically built in the first stage by a small group of households. Most of the households chose to move into trailers, or finished or unfinished permanent structures (see figure A6).

Trailers (Campers or Mobile Homes)

Trailers were commonly seen in colonias because they provided an instant structure with differentiated spaces that could be moved onto and away from the lot at any time (see figure 45). Households also revealed that a secondary market of used trailers and campers facilitated the acquisition and resale of these structures. Lots of used trailers for sale are actually seen on the roads and highways entering Laredo. Households saw a trailer as an investment that could be used as needed and easily sold as permanent housing structures were completed. Smaller campers were used as temporary residences too. It was common to see campers and trailers being part of the housing structures used in the multifamily lots. Trailers were more frequently seen in the 1st and 2nd stages (see figure A6) and they kept being brought to lots although less frequently until the 8th stage (see figures A7, A8 and A9).


Figure 44. Temporary structures used to move into the lot. The left image shows a small wooden house and a fence made with recycled materials that signal occupation of the lot. (Pueblo Nuevo, Laredo-TX). The image on the right shows the original structure used when the household moved into the lot that is still preserved as a storage space (Los Altos, Webb County-TX 2007)


Figure 45. Campers and trailers used as temporary and permanent residences. The image on the left shows a camper that was brought to accommodate relatives temporarily next to the porch of the permanent structure of the main household (Tanquecitos II, Laredo-TX). The image on the right shows a trailer that has been later expanded attaching an addition towards the rear of the lot (Pueblo Nuevo, Webb County-TX 2007).

Figure 46. Permanent structure built next to the initial temporary structure. The original temporary structure made with recycled metal panels and covered with a plastic tarp on the roof has been preserved after the permanent structure was built (Larga Vista, Webb County-TX 2007).

Permanent Structures

Permanent structures were by and large the most common structures seen in the studied colonias (see figure 46). Permanent structures were built in as many stages as needed according to the available resources and the growing needs of the household. Usually, permanent structures containing one or two rooms were built initially, and then added to over time. Building the exterior structure and exterior walls preceded (often for several years) construction of interior partitions and finishing materials. Permanent structures are the most frequent house form built in the 1st stage (see figure A6) and they kept being built to substitute temporary structures or trailers between the 2nd and 5th stages (see figures A6, A7 and A8).

Attached Additions to the Existing Structures

After the initial building of a permanent structure, the most frequent change at any stage was attaching additions to the existing structures. Attached additions were essentially the horizontal enlargement of the existing housing structure and it was common that the sume of successive additions would end up being larger than the original structure built on the lot (see figure 47). In some cases, however, the additions were attached to trailers or manufactured houses making not permanent structures impossible to move them later without destroying the addition. Attached additions are seen from the 2nd stage until the 10th stage (see figures A6 to A10).

Second Floor Additions

Second floor additions describe the vertical addition of new structures to the original house form. These additions were seldom seen probably because the large size

of the lots made it easy to expand horizontally (see figure 48). However, in some of the denser clusters or subdivided lots, second floor additions were a way to conserve land. Second floors were usually reserved for bedrooms and, as a few of the surveyed household stated, to take advantage of lower temperatures and circulating breezes. Second floor additions were seen in the 2nd, 3rd, 4th, 5th and 7th stages (see figures A6 to A9)

Detached Structures

Detached structures were the second most common way to expand existing covered areas and were built apart from the original structure. They were used in various ways as covered areas for parking, storage, tool sheds, water pumps, or for household activities such as workshops and animal raising (see figure 49). Detached structures might also be used as separate rooms to house extended family members, relatives, and tenants. Detached additions are seen from the 2nd through 8th stage (see figures A6 to A9).

Dividing Existing Covered Space

An important houseform change registered in the survey was dividing existing covered space. It consisted of partitioning enclosed areas into smaller rooms (see figure 50). Dividing space was usually a step that followed either attached or detached additions to the initial main structure. It was the logical step (although not necessarily immediate) after building shell space to define areas and gain independence and privacy between spaces. Often times, years passed between the construction of the exterior shell and the construction of the interior partitions. Separating covered space was frequent between the 2nd and the 6th stage (see figures A6 to A8).


Figure 47. Additions attached to structure originally built or set on the lot. The image on the left shows that the original permanent structure has been expanded attaching another permanent structure towards the front. The image on the right shows a trailer that has been expanded with permanent attached additions on left and right sides (Pueblo Nuevo, Webb County-TX 2007)


Figure 48. Second floor additions to the original structure. The left image shows a second floor addition with self-supporting structure built on top the original trailer set on the lot. The right image shows a two story addition attached to the original permanent structure built on the lot (Pueblo Nuevo, Webb County-TX 2007).


Figure 49. Detached structures added to the original structure. The left image shows a roofed addition on the rear of the lot used as a workshop by the household head (Los Altos, Webb County-TX 2007). The right image shows a roofed detached addition used for storage purposes (Tanquecitos I, Webb County-TX 2007)


Figure 50. Enlarging and dividing existing covered space. The image on the left shows the works preparing to extend the front wall of the permanent structure to enlarge the living area inside (Los Altos, Webb County-TX 2007). The image on the right shows an existing space that will be divided by a partition wall that is being constructed (Tanquecitos I, Webb County 2007)


Figure 51. Prefabricated water tanks installed next to house structures. Big water tanks of PVC or fiberglass are usually added to the house form sometime along its development. The left (Los Altos, Webb County-TX 2007 and right images (Tanquecitos II, Webb County-TX 2007) show both similar water storage tanks that are usually filled with water imported from remote locations.


Figure 52. Cages for chickens and other small animals. Common detached additions include cages and roofed areas to raise small farm animals such as birds (Tabquecitos I, Webb County-TX 2007)

Installing or Building Water Tanks

Water storage was critical due to the lack of running water in the colonias. Most of the residents of the surveyed colonias stored water in large inexpensive plastic or resin water containers (see figure 51). Before prefabricated water containers became widely commercialized, a concrete water tank built on site was a much needed but significant investment for the household (see figures A6 and A8).

Horse or Cow Corral/Pig Pen/Chicken Cages

It was common at any time to bring poultry and other caged animals to the lot (see figure 52). On some large lots, seeing goats, horses and even cows was not rare (see figure 53). Raising animals is usually regarded as a link to a rural lifestyle. However, it was also a way to provide for household needs and even help to sustain the household if the activity was scaled up for commercial purposes (see figures A7 and A8).

Fencing Lots

In several of the surveyed cases a fence surrounding the lot was built to define the limits of the property (see figure 54). Fences varied from simple lines of barbed wire and conventional chain link fences, to more elaborated fences made of recycled corrugated metal and scrap metal sheets (see figures A6 to A8).

Kitchen Cabinets

Many of the kitchens at colonias were initially furnished with recycled kitchen cabinetry or simple working tables (see figure 54). Households substituting old cabinets with new custom built kitchen cabinets evidenced a sophisticated level of consolidation. (see figures A6 and A7).


Figure 53. Small crops and corrals used to raise farm animals. Other productive activities are part of the colonias environment. Small corn crops such as in the left image can be seen in the more rural colonias (Pueblo Nuevo, webb County-TX 2007). The right image shows a small corral for a calf in the back yard of a lot (Tanquecitos I, Webb County 2007)


Figure 54. Fencing lots and renewing kitchen cabinets. These are improvements to the house form that occur after the most important needs of the households have been covered. The left image shows a very elaborated fence enclosing the lot of a well consolidated house (Pueblo Nuevo, Webb County-TX 20007). The right image shows recently installed kitchen cabinets that replaced the old recycled cabinets (Tanquecitos I, Webb County-TX 2007)


Figure 55. Roofs built over existing trailers. The left image shows a trailer that has been roofed with a completely new structure. The image on the right shows that a roof has been built over an old camper to protect it from rain and sun (Pueblo Nuevo, Webb County-TX 2007).

Replacing Existing Roofs

Some of the oldest structures surveyed had already needed replacement of roofing materials. This was more frequent in some of the used trailers initially brought to the colonias, but it also happened in other structures built with reused and recycled roof materials that had since worn down. Replacing existing roofs occurred in the 3rd and 4th stages (see figure A7).

Building Roof over Existing Trailer

Complete roofs were sporadically built above trailers with the double purpose of protecting deteriorated roofs from rain and insulating the structure from direct exposure to sun radiation (see figure 55). This odd looking improvement increased performance of the house form and showed an efficient investment of scarce resources. (see 2nd and 5th stage in figures A6 and A8).

Building Uncovered Walls

Although a less common practice, building uncovered walls was a way to initiate construction of some structures. Since materials left uncovered for long period of time needed to be weather resistant, building uncovered walls also revealed construction practices that were more common in Mexico than in the US colonias. Only walls of concrete masonry units (cinder blocks) or bricks could remain in the open for a considerable time before they were eventually roofed. These materials and methods were rare in the colonias surveyed where most of the construction was conventionally wood framing. Building uncovered walls was seen in the initial stages (see figures A6 and A7).

Improving Exterior/Interior Finishing

Improving the exterior or interior finishing of the house form was a stage most commonly seen after sufficient covered living area had been built and differentiated. It was the point at which resources could be put into preserving or increasing the aesthetic value of the house form. Improving finishings involved renewing exterior materials such as siding or plaster, as well as installing interior gypsum board (sheet rock), and bathroom or kitchen tiles or vinyl. It also included painting or repainting exterior and interior walls. Improving finishings is most commonly seen between the 2nd and 7th stages (see figures A6 to A9).

Building Driveways/Ramps/Pathways

Building driveways, ramps or pathways involved laying-out and building graded elements that facilitated vehicular and pedestrian access to the structures built on the lot. Before driveways, ramps, and pathways were built, lots would be characterized by dusty earth paths that turned muddy during rainy periods. The construction of these elements was a sign of an advanced level of consolidation. Building driveways and ramps is seen in initial stages for house forms that have been rapidly completed (see figure A6) and later in advanced stages as other house forms are completed (see figures A7, A8 and A10).

Flooring

Flooring involved finishing already built interior floors with materials such as tiles, vinyl, carpet, etc. Concrete slabs remained exposed for years while more important improvements were made. Finishing floor slabs with flooring materials was also a sign that investment in the comfort and aesthetical aspects of the house form had become

priority. Flooring was seldom seen in the house forms of the sample and it mainly occurred during the first five stages (see figures A6 to A8).

Windows and Doors

Some structures were built with unfinished window openings and doorways. By the time of this study, some households had recently added glass windows, as well as interior doors. Nevertheless, it was still common to see windows boarded or covered with plastic sheets or liners and interior doorways with no more than a curtain to provide privacy. Even though it is arguable that doors and windows were cosmetic improvements, they most likely signaled that more critical needs had been already covered and resources could be devoted to them (see figures A7 and A9).

5.2.5 Houseform Changes per Stage of Construction

The following analyses focus on the type of change made on the house form at each of the stages of construction to determine what changes occurred first, what came next, and so forth. Charts showing the categories of house form change per stage (figures A6 to A10) were summarized in table VII on the next page. Results show that a clear majority of households started building a permanent structure after moving onto their lot. Some households built first a provisional structure in which to live (11%). Surprisingly, only a third of households (31%) set a trailer, camper, or manufactured house on the lot as their first building stage. This was a substantial number but, contrary to general images of colonias, it was an alternative chosen by households in the colonias of this study second to building a permanent structure.

Table VII. Summary of house form change per stage for all colonias

1st Stage	55% Permanent St.	31% Trailer/Manuf.	11% Temporary St.	
2nd Stage	42% Attached Add.	17% Permanent St.	11% Detached Add.	
3rd Stage	45% Attached Add.	19% Detached Add.	9% Dividing Covered Space	
4th Stage	44% Attached Add.	15% Detached Add.	9% Trailer/Manufactured	
5th Stage	39% Attached Add.	18% Detached Add.		
6th Sage	50% Attached Add.	15% Detached Add.	10% Trailer/Manufactured	10% Dividing Covered S.
7th Stage	50% Attached Add.	16% Detached Add.	11% Trailer/Manufactured	
8th Stage	50% Attached Add.	33% Trailer/Manuf.		
9th Stage	66% Attached Add.			
10th Stage	50% Attached Add.	50% Dividing Covered Space		

More important, in the subsequent stages the preferred change was to attach or annex structures to enlarge the livable area of the household. In stage 2, some of the temporary structures and trailers were substituted by or enlarged with permanent structures built on site. A third apparent option between stages 2 and 7 was the addition of detached structures to enlarged the livable area. Surprisingly, these detached structures were often trailers brought onto the lots.

One of the most important findings revealed that priority was given to enlarging livable space. House form changes that expanded livable space for the household were frequent in the early stages. After livable area was enclosed and covered, households then divided interior spaces, finished walls and floors, painted, etc. This finding was consistent with the way covered area was increased over time. In fact, the data show that almost 60% of the total covered area was completed during the first two stages and more than 90% was completed within the first 5 stages. (see table VIII and figures A11 to A15).

Table VIII. Covered area per type of house form change (means in sqf of covered area)

Stage / house form (sqf means)	1 stage	2 stage	3 stage	4 stage	5 stage	6 stage	7 stage	8 stage	9 stage	10stage
trailer/camper	773	520	713	492	754	486	408	413	--	
temp. structure	243	--	--	--	--	--	--	--	--	
perm. Structure	554	863	534	1145	676	--	576	--	--	
attached addition	--	305	231	320	377	301	311	300	163	240
detached addition	--	211	231	442	139	309	235	225	--	
2nd floor addition	--	985	400	221	352	--	96	--	--	
all house forms (mean)	551	389	225	332	284	253	277	325	163	240

An analysis comparing the frequency of different house form changes and the time taken to complete each of the stages confirmed that most of the changes involving increasing covered area were completed early in the consolidation process (see figures A16 to A25 in Appendix A). During stage 1, trailers, campers, and manufactured houses were brought to the lot immediately before or even as households moved in. Because they were moved and set on the lot, they showed the shortest time for completion (between 0 and 1 year). But most of the temporary structures (11% of the structure of the 1st stage) and even the permanent structures (46.5% of the structures built during the 1st stage) also took between a few weeks and 2 years to be completed. A few of the permanent structures, however, extended their completion over a longer time up to a maximum of six years (8.5% of the structures built on the 1st stage) (see figure A16).

Stage 2 was more dispersed. Most of additions during this stage were built within three years after the stage 1 (23% of structures of the 2nd stage). The remaining additions (19% of structures of the 2nd stage) were spread between the 4th and 15th year after completion of the 1st structure. Again, the great majority of the permanent structures

built for the first time in replacement of temporary structures or in addition to the initial trailers or permanent structures of the 1st stage, were completed within a year (10% of structures of the 2nd stage) and all of them within the six years following the completion of the first structure (7% of structures of the 2nd stage). Structures detached from the initial house form were built mostly during the first 2 years of the 2nd stage (9% of structures) and the remaining (2% of structures) took up to 5 and 6 years to complete (see figure A17).

During the third stage, attached additions were again spread during 11 years with most of them (21% of structures of the 3rd stage) being completed within three years after the second stage. Detached additions were also spread along 15 years with a majority being completed within the first three years (11% of the structures on the 3rd stage) and the remaining (8% of structures of the 3rd stage) after the 4th year of the 3rd stage. Dividing covered space was the most frequent house form change in the third structure, almost all made during the first three years (8% of house form changes in the 3rd stage) (see figure A18).

The fourth stage showed again adding covered area as the most frequent change to the house form (68% of changes of the 4th stage). Attached additions were again spread during 18 years with most of them (19% of house form changes on the 4th stage) built during the first 3 years. Similarly, most detached additions were built within the first 2 years after the 3rd stage (11.5% of the structures built in the 4th stage) and the remaining between 8 and 16 years of the 4th stage (3.5%). Most trailers were brought within 2 years after completing the 3rd stage (6% of the house form changes of the stage), but some took more than 5 years (3%) (see figure A19).

The fifth stage also showed most attached additions (25% of the structures built on this stage) and most detached additions (13%) built within the third and first year after the 4th stage respectively. A smaller number of both were completed after the 4th year of the stage (5% of the total changes for detached structures) and the 5th year (9% of changes for attached structures) (see figure A20).

The sixth stage showed once more most of the attached additions completed within the first three years (44% of the 6th stage house form changes) and most detached additions within the first 2 years (12% of house form changes). Some attached additions (6% of the house form changes), detached additions (3%), and all the trailers (10% of house form changes for this stage) were built after the 4th year after completing the 5th stage. Dividing covered space was evenly spread between the 1st and 5th year after the previous stage (see figure A21).

The seventh, eighth, and ninth stages showed that the majority of the most frequent house form changes, that is, attached and detached additions as well as trailers, were completed or brought into the lot between the 1st and the 5th year after completing the previous stage. During the final stage attached additions and dividing covered space were completed immediately after completing the previous stage (see figures A22 to A25).

Table IX is a summary of the most relevant house form changes and the time that it took to complete them on each stage. As it can be appreciated, while most of the permanent structures in the 1st and 2nd stages are built within the first 3 years, trailers and temporary structures are set up immediately. Most of attached structures that are built

through the rest of the stages are completed within the first 3 years of each stage. But a smaller percentage extends over that, some even beyond 7 years. On the other hand, detached structures that are built from the 2nd through the 7th stage are mostly completed within 2 years with few extending over that. Trailers brought at any stage after the initial (4th, 6th, 7th and 8th) are set up onto lots more randomly in time. Dividing covered space is the other relevant house form change that occurs also soon after completing the previous stage, but it also extends over time in several of cases.

Table IX. Summary of house form change vs. time to build per stage for all colonias

		0	1	2	3	4	5	6	7+ years
1st Stage	55% Permanent St.	20%	22%	4.5%	2%	--	4.5%	2%	
	31% Trailer/Manuf.	29%	2%						
	11% Temporary St.	9%	1%	1%					
2nd Stage	42% Attached Add.	2%	16%	5%	2.5%	2.5%	3.5%	3.5%	7%
	17% Permanent St.	7%	3%	2%	2%	--	--	1%	2%
	11% Detached Add.	6%	1%	2%	--	--	1%		1%
3rd Stage	45% Attached Add.	7%	13%	11%	4%	3%	3%	--	4%
	19% Detached Add.	3%	4%	4%	2%	1%	2%	1%	2%
	9% Dividing Covered Space	5%	1%	2%	--	--	--	--	1%
4th Stage	44% Attached Add.	7%	12%	10%	2%	2%	1%	1%	9%
	15% Detached Add.	6%	2%	3.5%	--	--	--	--	3.5%
	9% Trailer/Manuf.	5%	1%	--	--	--	1%	--	2%
5th Stage	39% Attached Add.	4%	13%	9%	4%	--	4%	4%	1%
	18% Detached Add.	6%	7%	--	--	3%	2%		
6th Sage	50% Attached Add.	12%	15%	5%	12%	--	3%	3%	
	15% Detached Add.	6%	6%	--	--	--	3%		
	10% Trailer/Manuf.	--	--	--	--	7%	--	3%	
	10% Dividing Covered Space	--	3%	--	3%	2%	2%		
7th Stage	50% Attached Add.	--	6%	11%	17%	6%	--	--	10%
	16% Detached Add.	6%	--	5%	--	--	--	5%	
	11% Trailer/Manuf.	--	6%	--	--	--	5%		
8th Stage	50% Attached Add.	--	--	17%	17%	--	--	--	16%
	33% Trailer/Manuf.	--	16.5%	16.5%					
9th Stage	66% Attached Add.	--	--	33%	33%				
10th Stage	50% Attached Add.	50%							
	50% Dividing Covered Space	50%							

5.3 Analysis on Households

Collecting long-term information about the characteristics of households and how they changed since moving to the colonia proved more difficult. Household size and composition in colonias are very dynamic. A family not only grows when children are born, members marry or extended relatives join the household. The family shrinks as children grow up leaving the household or extended relatives move out. Surveys show that a second generation of colonia inhabitants was brought or born and raised in the colonias. Sometimes, a third generation of colonia inhabitants was created by descendants of the original household who married but stayed in the household. Even sons and daughters of the household who joined the military or had left the household for work, studies or marriage came back sometimes with partners and children of their own. There were also other relatives, such as parents, brothers, sisters, and cousins who were part of the household or came at a later stage and ended up living permanently with the original household.

The survey intended to collect information on all the people who, at any given time, joined or left the household since its arrival to the colonia. However, household heads tended to report only the people who were considered permanent members of the household. Thus, members of the extended family, relatives or friends who lived temporarily within the household were missed in the study. It is possible that this was because county and federal programs restrict access to their programs to single-family households. Household heads are cautious about providing information of who the members of the household are. For the same reason, attempts to obtain information about

tenants living on the lot were not consistently possible. This was the case even though sometimes structures observed on the lot strongly suggested the presence of permanent tenants. Finally, attempts to obtain access to renters or to clusters of structures that were exclusively for rental (as advertised by signs on the fences of some of these lots) were unsuccessful. Thus, the analyses included in this section are limited to the current characteristics of the household on the lot surveyed.

Descriptive data of households included their current demographic information such as distribution by age and gender, composition of the household, education level and occupation of all household members, as well as place of residence of the household head before moving to the current house. The only data that could be analyzed over time were the motivations given by household heads to introduce changes to the house form. This data is presented below.

5.3.1 Household Demographics

The total population living in the sampled households was 476 and the mean household size was 3.97 people, which was smaller than the 4.15 people per household recorded in the 2000 census. Interpretations of this slight change are discussed in the next section. It should suffice to say, however, that it was expected that a number of sons and daughters had left the household during the last 7 years. Households ranged in size from just the head of household to as large as 10 members (see table X). The most common household size was 5 members (20.3%) followed by 3-member households (16.3%) and 2-member households (12.5%). Single member households had

considerably increased from 9.76% in 2000 to 16.3% during this survey. Households with more than 7 members were rare, comprising 5% of the total (see figure 56).

Table X. Household size for all surveyed colonias

Size of Household (people)	1	2	3	4	5	6	7	8	9	10
Frequency (# of households)	23	15	20	13	25	10	11	4	0	2
% of Total	18.7	12.2	16.3	10.6	20.3	8.1	8.9	3.3	0	1.6

In terms of gender, the study population was 48.7% male and 51.3% female, which was also a slight inversion of the male/female proportion recorded in the last census (50.93% male, 49.07% female). While some households were entirely female or male, there were never more than 6 males in a household while females could reach 7 in some cases. There were also more exclusively female households (15.8%) than households exclusively male (5.8%). Figures also show that 70 to 80% of households had 1, 2 or 3 males and/or females (see tables XI and XII).

Table XI. Total males for all surveyed colonias.

# of Males in Household	0	1	2	3	4	5	6
Frequency (# of households)	19	37	22	26	9	5	2
% of Total	15.8	30.8	18.3	21.7	7.5	4.2	1.7

Table XII. Total females for all surveyed colonias.

# of Females in Household	0	1	2	3	4	5	6	7
Frequency (# of households)	7	44	30	22	11	2	2	1
% of Total	5.8	36.3	25	18.3	9.2	1.7	1.7	.8

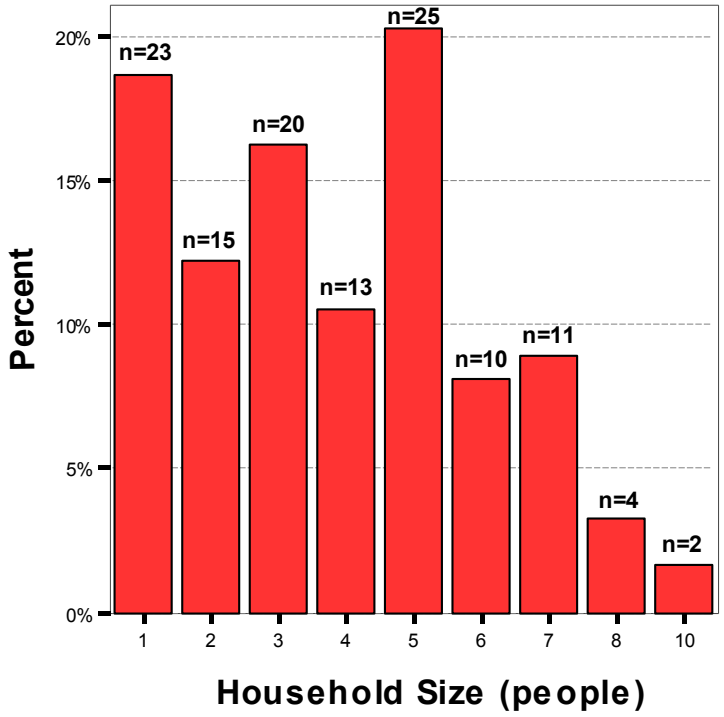


Fig 56. Household size of the surveyed sample

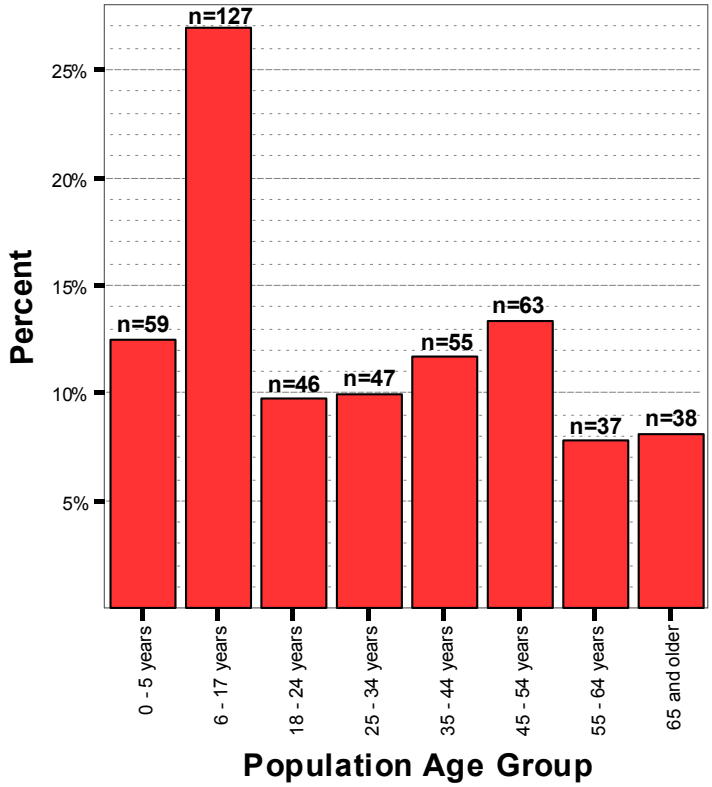


Fig 57. Population per age group

The average age of the population was 30 years, with a range from 1 to 85 years. The median age was 26 years. These figures represented a small increase from the 2000 census, which showed the median in the group between 22 and 24 years of age. Children 5 year of age or less constituted 12% of the population, while 24% were between 5 and 17 years of age. People 18 and older represented 64% of the population, with people between 18 and 24 years representing 8%, the group between 25 and 34 was 10%, the group from 35 to 44 years was 18%, and between 45 and 64 represented 21%. Finally, people over 65 years old represented 7% of the total population (see figures 57 and 58). Of the overall population, 26% were household heads, 19% were their partners, and 55% represented other members of the household.

Seventy eight percent of the households were headed by men with 22% headed by women. The average age of household heads was 51.35 years and the median was 50 years old. The youngest household heads were 22 years old and the oldest were 85 years old (see figure 59). One quarter of household heads were single while three quarters had partners whose average age was 45.81 years and the median was 45 years old. The youngest household head partners were 18 years old and the oldest were 73 years old.

The other members of the household were: 41% sons and daughters, 9% grandsons and granddaughters, and 3% of sons-in-law and daughters-in-law. The remaining 2% were other in-law relatives, parents, great-grandsons and great-granddaughters, and other extended relatives such as nephews, brothers and sisters, uncles and aunts, etc. (see figure 60).

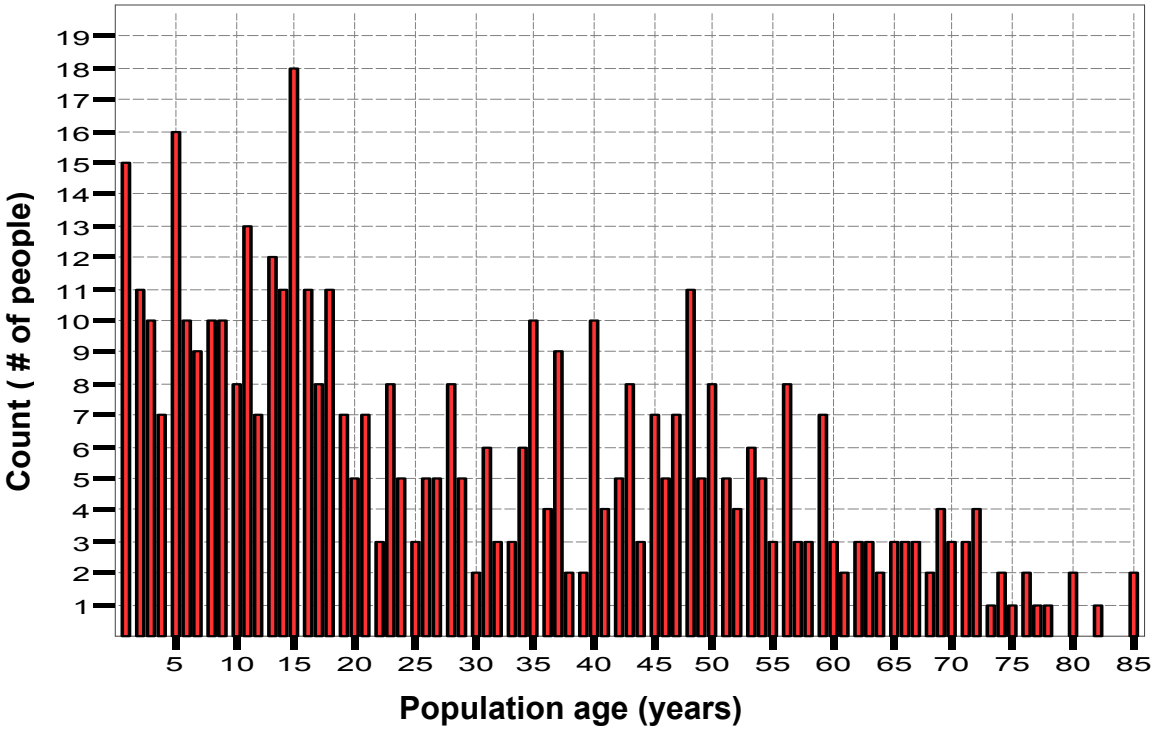


Fig 58. Population ages of the surveyed sample.

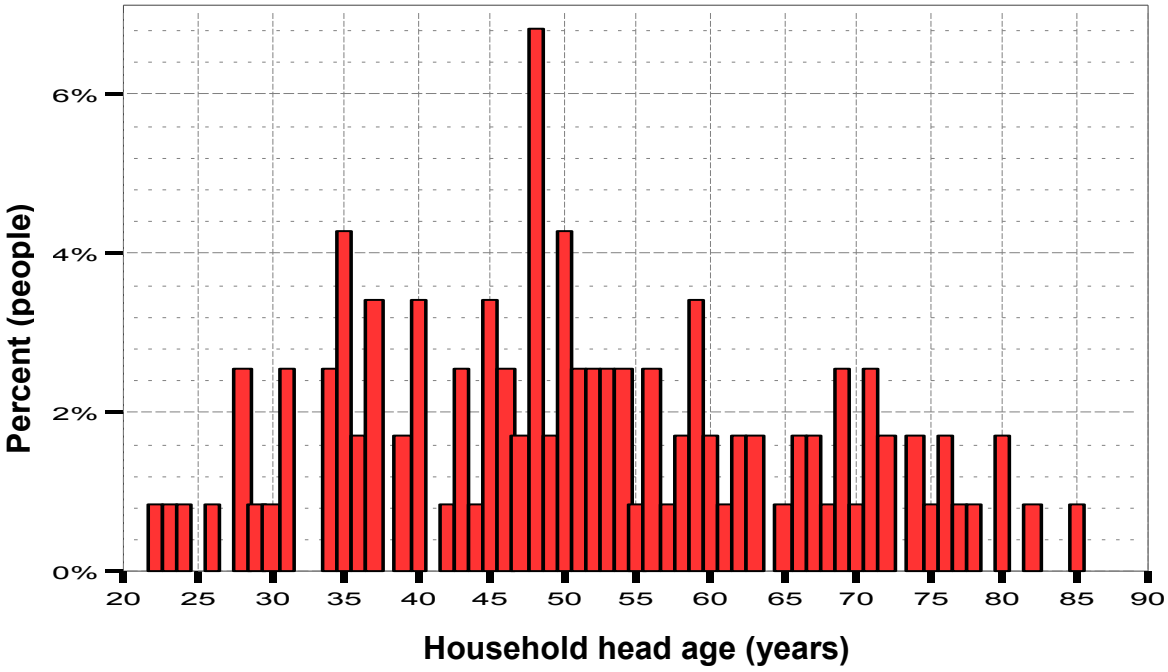


Fig 59. Population age groups of the surveyed sample.

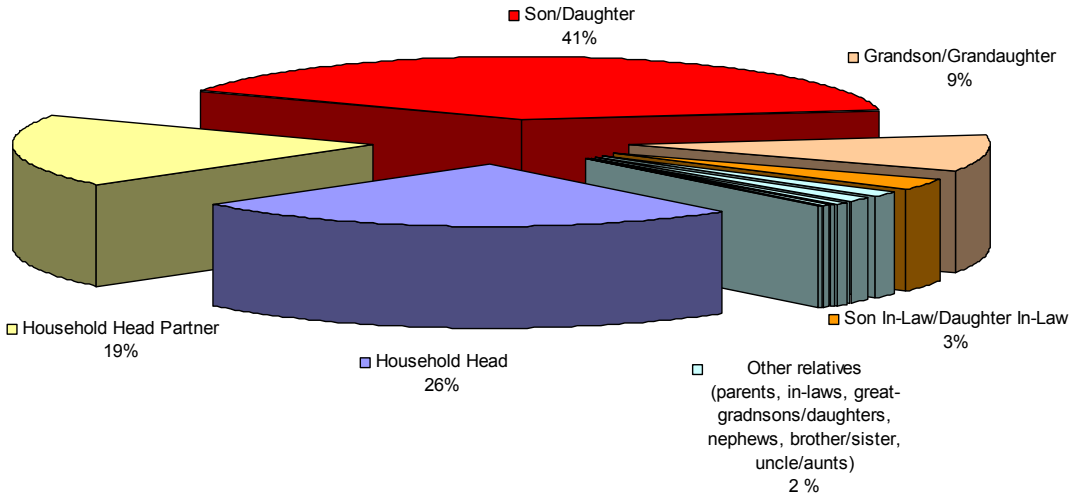


Fig 60. Relationship of household members with household head.

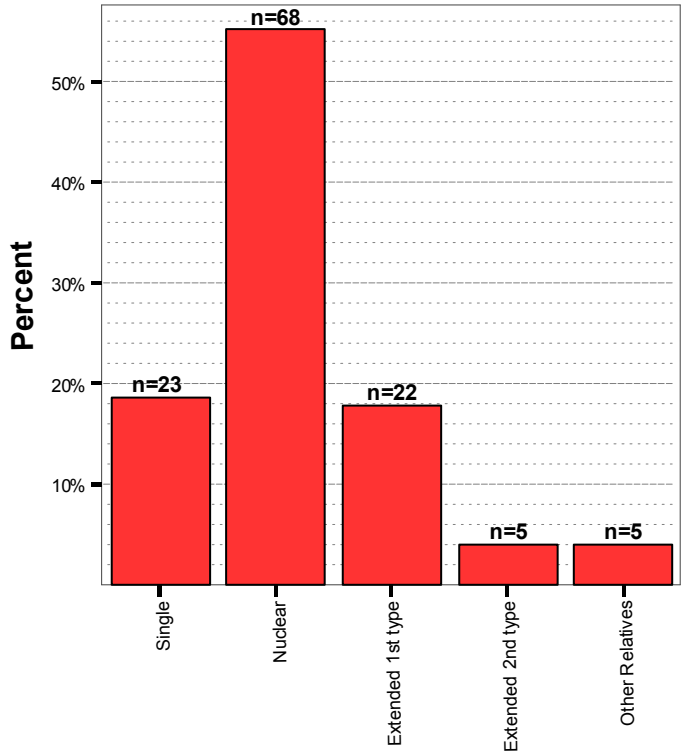


Fig 61. Household compositions

(Single-household head; Nuclear-with partner and/or son/daughters; Extended 1st type with grandchildren and/or parents; Extended 2nd-with great-grandchildren and or grandparents; Other relatives-with any other relatives).

5.3.2 Structure of the Household

The household structures of the surveyed colonias were diverse. The majority of the households included between 1 to 5 sons and/or daughters of the household head (64.22%). Most of these were children, but some were already adults who remained in the household for diverse reasons. Sixty five percent of the households with sons and/or daughters did not include other relatives (41.74% of the total number of households). The remaining 35% of households with sons and/or daughters (22.48% of the total number of households) included grandchildren (16.26%) and/or sons- and daughters-in-law (9.75%). Sons and daughters often went away after marriage or for work, but they also returned to their households with partners and children of their own. All remaining households were constituted by a single member (16.30%), by the household head and partner (12.19%), or by household heads and other relatives (4.08%), included nephews, parents and parents in-law, brother and sisters, uncles, and even great-grandchildren.

A synthesis of household compositions found in our sample includes: a) 19 % of single households; b) 55% of nuclear households, which include the household head, partner and their sons and daughters; c) 18% of 1st extended households, which included grown up sons and daughters with or without partners and a third generation of grandsons and granddaughters to the original nuclear household; d) 4% of 2nd extended households that include a either grandparents of the household head, or great-grandsons and great-granddaughters, and e) 4% of household with other relatives, which includes any relative not described in the previous household types such as brothers, uncles, parents in-law, etc. (see figure 61).

Conversations with the household heads lead to realize that all relatives and members of the extended family reported in the surveys were considered the permanent members of the household. Even returning sons and daughters were considered part of the household after years of being away. Sometimes, grandchildren were also considered permanent members of the household, even if their parents were not. Households were willing to raise their grandchildren as a way to help sons and daughters who were going through difficult times or hardships. This was often the case of children from broken marriages or from single parents who were unwilling to return home.

According to this analysis, sons and daughters of the household head (79 households), as well as grandchildren (20 households) and sons in-law and daughters in-law (12 households) had the biggest impact on the household structure over time. Other relatives and members of the extended family accounted for 12 households so their impact was much lower.

Beyond knowing the characteristics of permanent members of the household, information about how the household composition changed over time as members were born, joined or left the household was inconsistent and imprecise. The initial objective of this study to see how household composition changed over time was not realized. Interviewees knew when their children were born, but did not always specifically remember when they left, nor when they and other relatives and members of the extended family moved in and/or out of the household. Fortunately, additional information collected in the survey established relationships between the household structure and the house form.

5.3.3 Previous Place of Residence of the Head of Household

More than 82% of the household heads interviewed were living in the U.S. before they moved to their colonia. Eighteen percent lived in Nuevo Laredo across the border just before they settled into their current location. Out of the 98 household heads coming from U.S. locations, 83 were already living in the city of Laredo, some of them (11) had even lived in the same colonia. Ninety four percent of the head households previously living in the US came from cities within the state of Texas (El Paso, Dallas, Houston, Austin, San Antonio, Hearne, and Hereford). Only 6 % (5 households) came from cities in other states, including Illinois, Minnesota, Wisconsin, and California.

The time spent in those cities before moving to their respective colonias in Webb County was also analyzed. Head households from Nuevo Laredo lived there between 1 and 50 years before they moved into their colonias (24.74 years average). Head households from Laredo lived there an average of 9.66 years, some as little as a few months and some up to 55 years. Overall, only 17 households (13.8%) came from places where they stayed one year or less. A majority (26 households or 21%) had spent between 2 and 3 years in their previous place of residence before moving to their present location in the surveyed colonias. Another 27 spent between 3 and 10 years in the previous place of residence, and 29 between 10 and 20 years. Finally, 23 remaining households spent more than 20 years in their previous place of residence before moving to their present colonias (see figure 62).

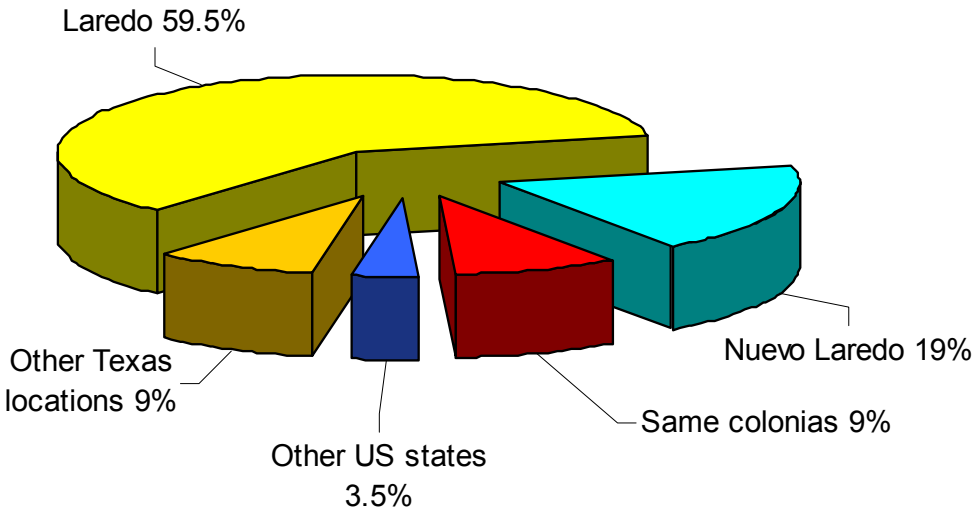


Fig 62. Households' previous place of residence

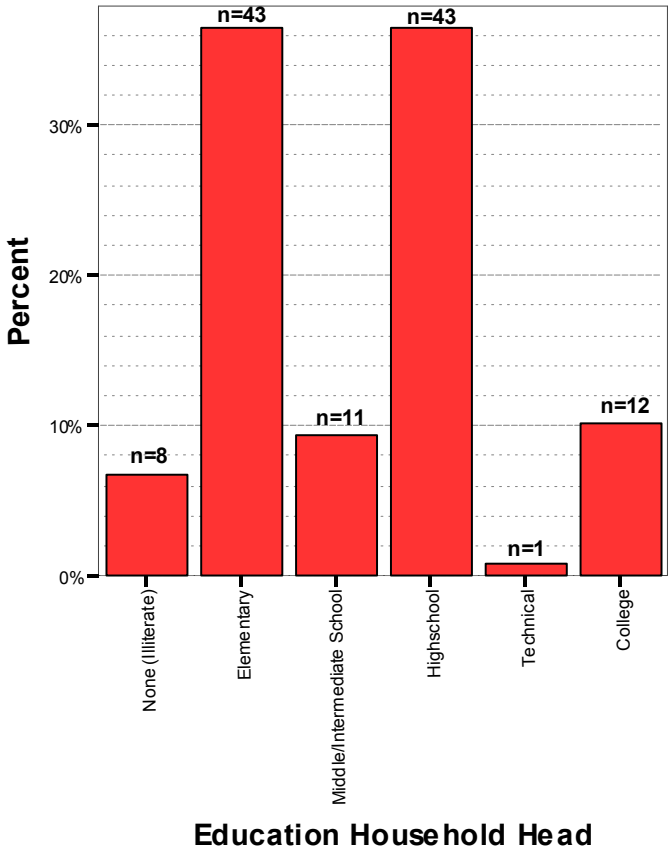


Fig 63. Education of the household head.

5.3.4 Education of the Household

The sampled population showed two major groups in the elementary (31.7%) and high school (35.7%) levels of education. These were followed by the groups of intermediate and middle school (11.2%) and with no education (12.9%). However, if children in pre-kindergarten age (8.7%) were separated from the group, population without any formal education was 4.2%.The most educated was a small group of inhabitants with college studies (7.6%) and a small group of people with technical degrees (0.4%). Finally, one inhabitant of the sample had graduate studies and another young resident was receiving special education.

A study of only the household heads yielded similar results showing two groups of people with elementary and high school education (34.6% each), followed by a smaller intermediate/middle school (9.3%) and college (10.2%) education groups. The group without formal education was 6.8% (see figure 63). The partners of the household heads showed the same proportions, although the group with only elementary education was a little larger (40.7%) (see figure 64).

Finally, analyzing all the other members separately showed a somewhat different distribution of the education levels. There were large groups in the elementary (29.7%) and high school (33.8%) levels, a smaller intermediate/middle group (12.6%), and a high non-educated pre-kindergarten group (15.2%). There was still a small proportion of not formally educated people (2.2%), and household members in college (5.6%). These figures are not surprising since almost 70% of this group was composed of the children of the households. When members of 17 years or less were not considered, the education levels considerably changed to a larger proportion of high school educated (58.3%), followed by college (18%) and elementary (12%), and uneducated (7%) (see figure 65).

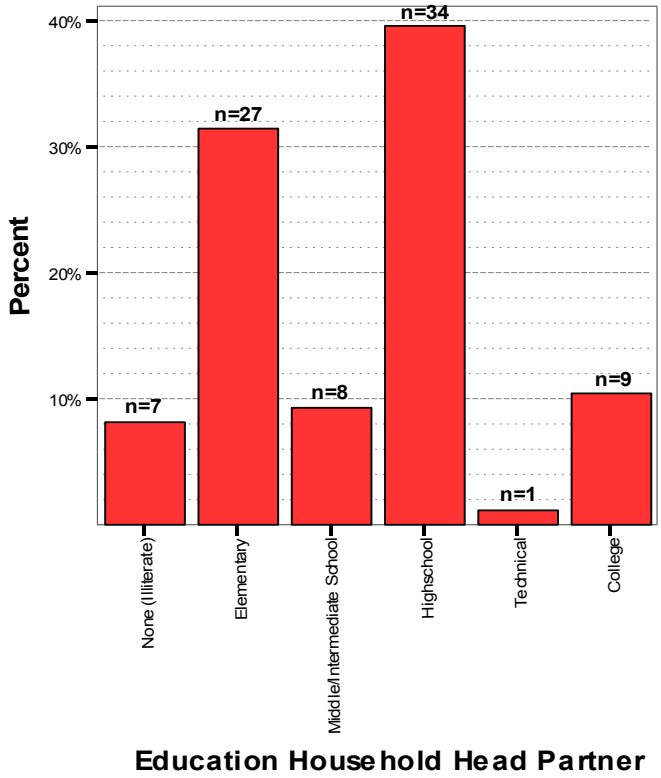


Fig 64. Education of the household head partner.

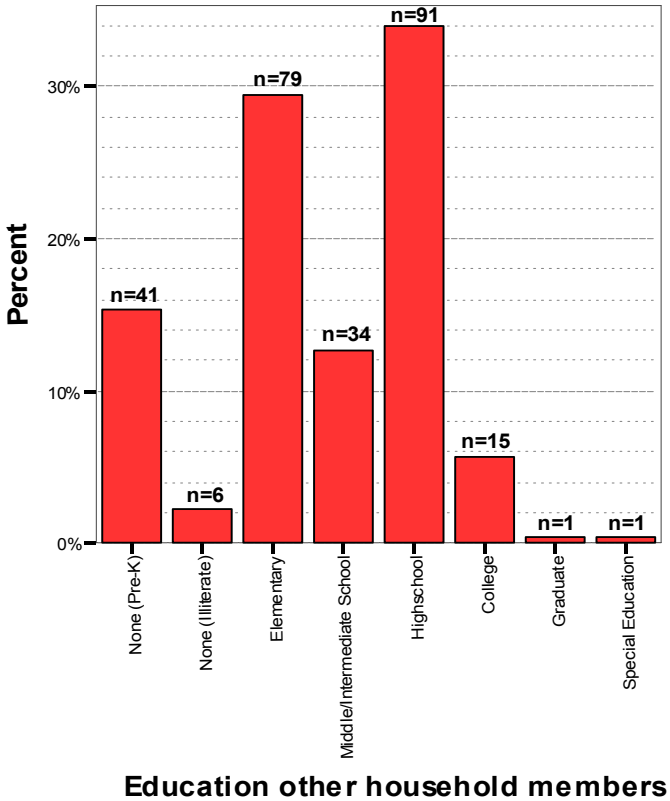


Fig 65. Education of the other members of the household.

5.3.5 Household Occupations

The range of occupations for the sample population was very diverse. Separate analyses were made for household heads, their partners and the other members of the household. The majority of the household heads were employed (74%) reporting 32 different jobs. The survey identified also 20% of retirees either by age or disability, and 6% of unemployed household heads, which together added up to more than a quarter of the household heads of the sample population. The most common occupation involved construction either as a contractor or worker (9.6%), followed by truck drivers (7%) and housewives (7%). The rest of the household heads were more or less distributed in a number of jobs that included various skill levels. Out of the 91 employed household heads, 12% worked on skilled jobs (teacher, health care, manager, office clerk, car dealer), 44% performed semiskilled activities (carpenter, plumber, welder, baker, machine operator, butcher, tire repairman, painter, retail, truck driver) and 11% had unskilled jobs (security, gardener maintenance, custodial, installer, driver) (see figure 66).

Partners of the household heads worked, by and large, keeping their homes (65%). A number identified themselves as unemployed (2.3%) or pensioned due to retirement of disability (7%). A slightly higher percentage had occupations in retail (5.8%), health care assistance (4.7%) and community work (2.3%). The rest of the household head partners (13.2%) had a number of other jobs that included teacher, office clerk, administration, school assistant, welder, truck driver, catering, stylist, waitress, and others (see figure 67).

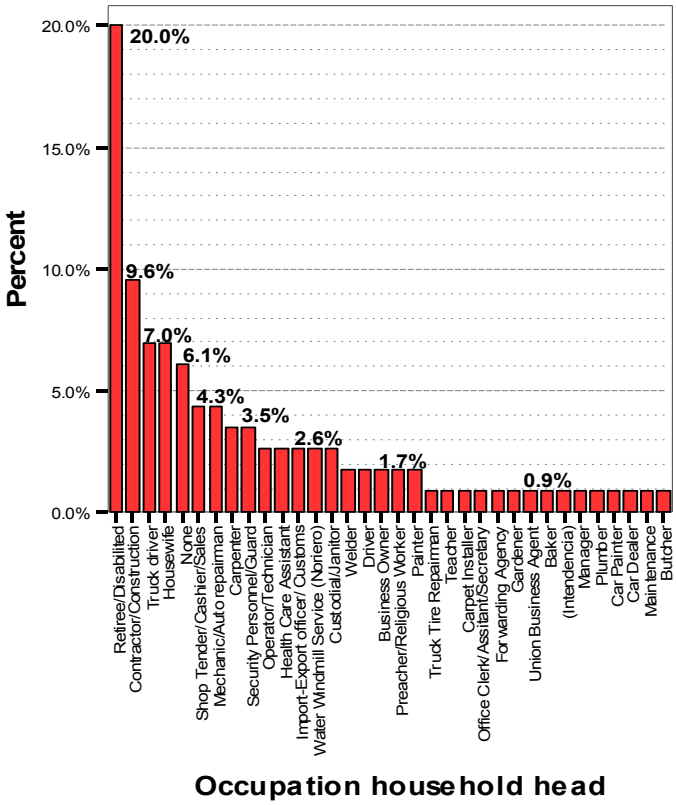


Fig 66. Occupation of the household head.

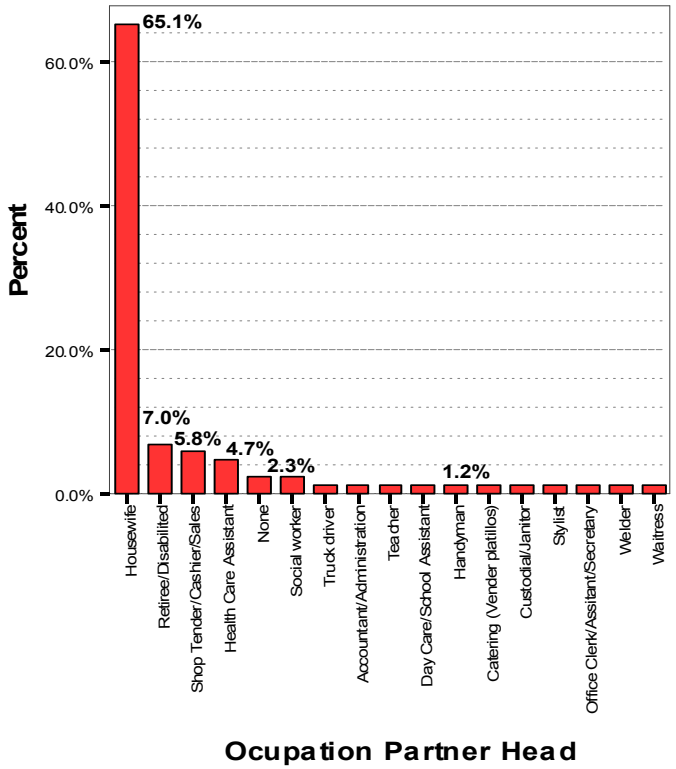


Fig 67. Occupation of the household head partner.

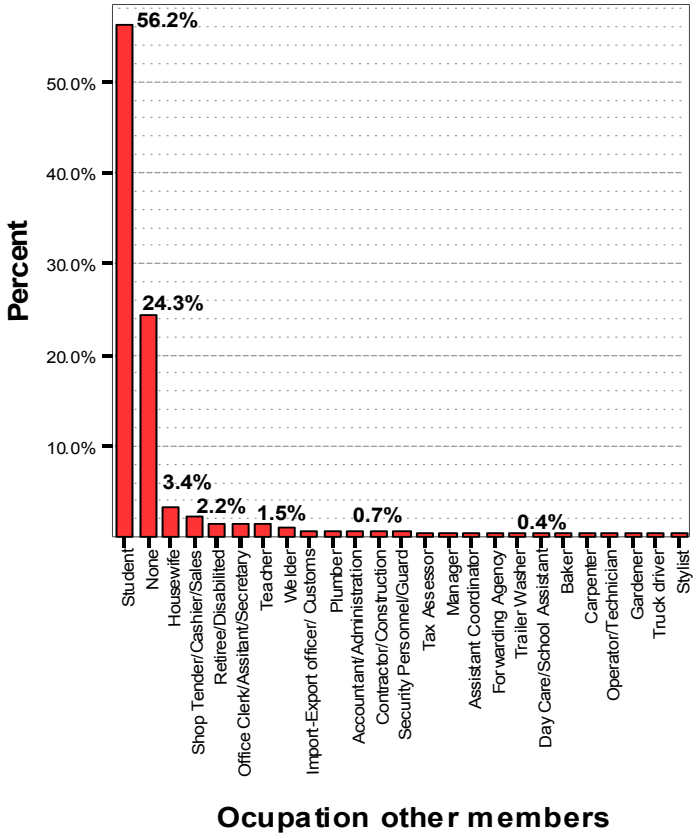


Fig 68. Occupation of the other members of the household.

Most of the other 262 household members were mainly school and college students (56%), although 24% had no occupation and 2% were disabled. A small number were housewives of sons or daughters of the household head (3%). The remaining 15% worked in various skilled jobs (5.6% in jobs such as teacher, office clerk, administration, manager), semiskilled jobs (7.9% in jobs such as school assistant, retail, stylist, baker, construction, carpenter, plumber, welder, machine operator, truck driver) and unskilled activities (1.5 % security guard, trailer washer and gardener). (see figure 68)

5.3.6 Motivations to Change the House Form

The household interviews sought reasons given by households for the completion of each stage of the house form. The objective was to identify needs, priorities, and preferences that motivated households to build new structures or choose some type of improvement over other during the development of the house form. Categories of motivations were created reflecting the various responses given by the households. The analysis of the sequence, frequency and proportion of these categories suggests households' priorities to make house form changes per stage of construction (see figures A26 to A30 on Appendix A). As it can be seen, moving in or occupying the lot was the main reason given for building structures during the first stage. During the second stage, changes to the house form were driven mainly by the desire to improve the living conditions of the household, accommodating services and facilities, and accommodating growing sons or family. Between the third and seventh stages, around 60% (between 56.86% and 77.77%) of the reasons given to make changes to the houseform included

improving the living conditions of the household, accommodating services and facilities, and providing shaded areas for the household. Providing shaded areas was still the main reason for house form changes during the eighth stage. The small number of households that went beyond the eighth stage and the variety of reasons given to make successive changes made generalizations difficult.

Categories of household's motivations are described below in the sequence in which households gave them more frequently to explain their changes to the house form.

To Visit on Weekends

This category describes the reasons to build any structure exclusively on lots used as ranches or for recreational purposes. Most of these were simple roofs or shelters, as well as outdoor barbecues and pit fires. According to descriptions by neighbors and colonia inhabitants, these structures were used to gather and entertain during weekends, holidays and celebrations. For the first stage, this reason was given by 3.33% of the households and it was not seen in other stages (see figure A26).

Built by the Previous Owner/Occupant

This category described structures that were already on the lot when the household acquired it. It was usually the case of households who purchased lots to original colonia settlers who never moved to the colonia or who lived in the lot for a short time. Sometimes these were temporary structures. In other cases, structures were more permanent and became the first stage of the resulting house form. For all cases, this category was described by a few households (5.83%) as their first stage. Logically, this category is not seen in later stages (see figure A27).

Owned Already

This category describes mainly structures that were brought to the lot and were owned by the household already. This category was also exclusive to the first stage (1.67%) when households brought mobile structures such as trailers and campers to their recently acquired lot (see figure A26).

To Move-in or to Occupy the Land

This category was used by households to describe the first structure built on the lot and used as shelter for the household. This was the main reason given by 71.67% of the households during the initial stage. This category also describes structures built as a sign of the occupation of the lot before the new household actually moved into the lot. These were either temporary or permanent structures of small size that were later improved upon or removed as permanent structures were built. Households that improved incomplete or small structures to subsequently occupy them represented 6.90% of the house form changes made in the second stage. This category was not seen again in further stages (see figure A26).

To Improve the Living Conditions of the Household

This was the most frequent reason given to describe the increase of covered habitable space or the improvement of the interior finishings of already built structures. The purpose of the changes under this category was to improve the spatial characteristics of the house form either quantitatively, in the amount of space per household member, or qualitatively, in the quality of the interior of already built spaces. Since it was implied that the household was already living in the house form, this category was not observed

before the second stage. After that, it becomes the principal reason given to change house form in the second (34.48%), third (27.45%), fourth (34.52%), fifth (29.52%), and sixth stages (35.2%). As house form consolidated, this category shared importance with others in the seventh (33.33%), ninth (33.33%, and tenth stage (50%) (see figures A26 to A30 in Appendix A).

To Accommodate Growing Sons and Daughters or Family

This category described the addition of covered habitable space, usually bedrooms, to accommodate members of the household who had previously shared rooms or other spaces of the house form. It was seen in a small proportion as early as in the first stage, when households enlarged existing structures acquired with the lot (1.67%). Thereafter, it became a constant reason to increase the house form's covered area. This reason for house form change was highest in the second stage (13.79%) and it declined in the third (9.80%), fourth (9.52%), fifth (5.55%), and sixth stages (2.94%). In the seventh and ninth stages its proportion grew again (5.55% and 33.33% respectively), probably because the number of households reporting house form changes diminishes considerably. Neither during the eighth nor the tenth stages is this category given as a reason for house form changes (see figures A26 to A30).

To Accommodate Existing or Incoming Relatives

This category describes the increase of covered habitable area with the purpose of housing relatives of the main household, usually for an extended period of time that may go from several months to a few years. This house form change was most frequent between the second and seventh stages. However, compared to other reasons given by

household heads, its proportion was low (1.72% of the changes during the second stage, 3.92% of the third, 4.76% of the fourth, 1.85% of the fifth, and 5.55% of the seventh). No occurrence is shown for stages one, six, eight, nine, and ten (see figures A26, A27, A28, and A30).

To House a Son or Daughter who Recently Married

The category usually included building structures attached or detached to the existing house form that were to be used by sons or daughters of the household head who stayed or moved back in with their partner. It usually involved a new structure with certain independence and autonomy from the main household structure. During the first stage, this category involved a small group of households (4.16%) who already lived in a nearby area (usually in the adjacent lot) and purchased lots to house their recently married son or daughter. But this house form change extended in a low proportion to the second (1.72%), fourth (3.57%), fifth (3.70%), sixth (2.94%), seventh (5.55%), and eighth stages (see figures A26 to A29).

To Accommodate Services or Facilities

This category included building outhouses, showers, bathrooms, water tanks, and septic systems. It described both the creation and addition of these structures to meet basic sanitation needs. This category was given as motivation for houseform changes during most of the stages. After a low proportion of changes made during the first structure (0.83%), it accounted for a significant proportion of the reasons given for changes in the second (20.69%), third (18.63%), fourth (13.10%), fifth (20.37%), sixth (20.58%), seventh (33.33%), eighth (20%), and tenth stages (50%) (see figures A26 to A29).

To Provide Shade

This category described building of structures to provide outdoor shaded spaces for the household's daily activities. Most of them included verandas, porches, and overhangs on facades that, in addition to extending the outdoor covered space, protected the existing structures from direct sunlight. Many were simply roofs without walls to protect trailers or under which to park cars or perform activities associated with the household such as workshops or covered storages. Like accommodating services, the proportion of this category remained relatively constant after the second stage (5.17%), when it became an important reason for house form change in the third (18.63%), fourth (16.67%), fifth (12.96%), sixth (20.58%), seventh (11.11%), eighth (40%), and ninth stages (33.33%). The first and last stages did not show this category (see figures A26 to A29).

Renovating Existing Building

This category included all renovations of interior and exterior finishings in existing structures of the house form. It also included new roofing, interior and exterior painting, the substitution of kitchen cabinets and old or deteriorated parts of the house for newer or updated replacements. This usually occurred on structures have been used for a period and were in need of some repairing. But it could also occur as the first stage of one household who moved into a lot that already had a structure (0.83%). This category was moderately low in all stages showing: 3.45% for the second, 0.98% for the third, 5.95% for the fourth, 1.85% for the fifth, and 2.94% for the sixth stages. There was no occurrence for stages seven, eight, nine, and ten (see figures A26 to A28).

Substituting Previous Structure

This category described the construction of a new structure on the site of a pre-existing one. It signified a major qualitative improvement because removing the existing structure actually resulted in decreasing covered space. Most of the changes observed in colonia house form avoided removing older structures, even if these were dilapidated, because it involved the use of labor and scarce resources with nearly no benefits. This reason for change was given by interviewees for the first time in the second stage (1.72%) and two more times in the third (0.98%), and the fourth stages (1.19%) (see figures A26 and A27).

To Generate Additional Income

This category included all the changes and additions made to the house form to generate alternative sources of income for the household. These included all attached and detached additions built as workshops, shops and stores. The category also included corrals for animals, chicken pens, and cages to produce eggs or raise animals that could be sold or traded in the community. House form changes citing this category slowly increased from the second stage (2.59%), reaching certain stability during the third (10.78%), fourth (9.52%), sixth (11.11%), and slowly decreasing in the seventh (8.82%), and eighth stages (5.55%) (see figures A26 to A29).

Building for the Future

These were improvements of any kind made during relatively long periods of time. This category included laying down a concrete floor slab to be built upon later, or building walls to be roofed in and undetermined future. As a general characteristic,

building for the future was a way to plan ahead before pressing needs urged for additional space. The category included households who built the initial structure while living in another place. Even though these improvements actually increased the value of the property, their major rational was to invest available resources for a future opportunity. The incidence of this category in the first (6.67%), second (6.03%), third (2.94%), and fifth stages (1.85%) confirms this category more as a building strategy to preserve the value of the invested resources rather than an economic strategy to increase the economic value of the house form (see figures A26 to A28).

Because it was a Good Opportunity, Affordable, or Cheap

This category included building or improvements made because materials, labor, or both were available and/or inexpensive for the household at the time when they were made. Similarly to the previous category, the reason given to make the improvement did not respond to pressing needs for space or services, but because a good occasion to make the improvement showed itself. There was only one case during the second stage under this category representing 0.86% of the reasons given for house form change (see figure A26).

Building Capital

This category described improvements made to increase the aesthetic and marketable value of the property. This reason for improvement was usually made after house form satisfied well the residential needs of the household. The two cases on this category were during the second (0.86%) and the sixth stages (2.94%) and included

cosmetic and accessory improvements to already consolidated structures (see figures A26 and A28).

To Satisfy a Household's Desire

This category described any improvement or enlargement of the existing structure exclusively for the owner's -or other household member's- preferences or desires. The category included things such as pavements, driveways, gates and other accessory elements built to fulfill a more personal need or aspiration. This category represented a low but consistent reason for house form change during the third (1.96%), fourth (1.19%), fifth (3.70%), and sixth stages (2.94%). Its proportion raises in the eighth stage (20%) because the number of changes to the house form drops (see figures A27 to A29).

5.4 Relationships between House Form and Household in Colonias

Analyzing the relationship between household and house form was one of the study's objectives. These relationships were based on the literature and previous research on housing linking progressive development and the changes produced in housing to the particular characteristics and needs of its household. In this study, households suggested the existence of these relationships in several of the motivations given to make changes to the house form.

Since most of the household data collected described the current characteristics of the household, studying how changes in the characteristics of the household (i.e.,

household size, type, etc) affected changes on the house form over time was not feasible. Only the households' motivations to change house form allowed a long term analysis.

However, exploring relationships between different household and house form characteristics was still possible by cross-examining data on household and house form (total area of the house form, number of stages to build the house form, and total time to build the house form).

5.4.1 House Form and Household Size

The connection between changes made to the house form and the growing household was consistently reiterated during the interviews. The reasons given went from growing children, returning sons or daughters and need to accommodate existing or incoming relatives. This part of the analysis looked at the extent in which house form and the characteristics concerning size and composition of the household were related.

The means of three house form characteristics (covered area, number of stages taken to built and total time taken to build the current house form) showed a slight increase as households became more numerous (see table XIII). However, this relationship was not always consistent. Table XIV shows means for house form total covered area increasing values for larger households in all but households of 4, 6 and 8 members. However, medians are not consistent with these findings. The values for house form covered area also show great dispersion and there is no significant correlation to support the relationship between these variables. (see figure 69).

Table XIII. House form characteristics vs. household size

Household Size (people) / House form (means)	1	2	3	4	5	6	7	8	9	10
Total covered area (sqf)	1,373.6	1,508.9	1,532.8	1,449.7	1,895.6	1,485.3	1,902.4	1,372.0	--	2,623.0
Stages to be built (#)	2.8	3.2	3.9	3.4	3.9	3.7	5.3	4.5	--	5.0
Time to be built (years)	9.6	8.4	13.7	14.9	12.0	9.1	14.9	11.8	--	15.0

Table XIV. House form total covered area vs. household size

Household Size / House form Area	1	2	3	4	5	6	7	8	9	10
Mean (sqf)	1373.6	1508.9	1532.8	1449.7	1895.6	1485.3	1902.4	1372.0	--	2623.0
Median (sqf)	1274.0	1352.0	1302.0	996.0	1905.0	1666.0	2104.0	1326.0	--	2623.0
N (lots)	20	14	20	13	25	10	11	4	--	2
Std. Deviation	729.1	1143.9	645.5	944.6	890.1	673.2	653.0	248.6	--	1596.6

Means of the number of stages needed to complete the current house form also increased as the size of the household became larger. It seemed reasonable to interpret this relationship as the increase of the house form size as more people joined the household. But again households of 4, 6, 8 and 10 members were not consistent (see figure 70). Thus this analysis did not support this relationship either.

The relationship between the total time to build the current house form and the household size was less clear. No relationship was shown between the number of people in the households and the time it took to build the current houseform. The mean of the building time was lower for single and two-member households (see figure 71).

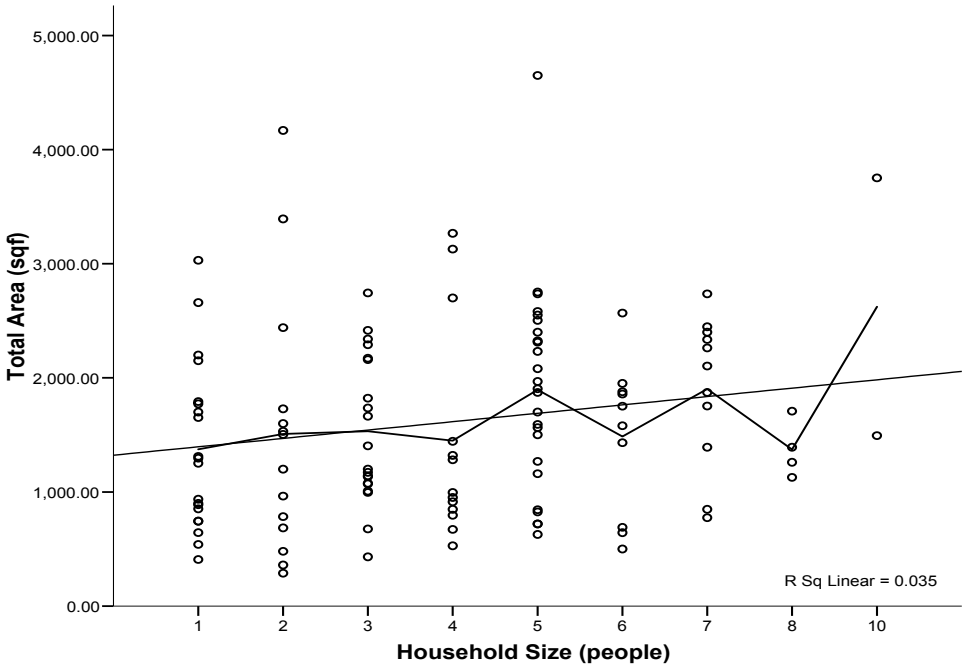


Figure 69. House form total area vs. household size (dispersion chart).

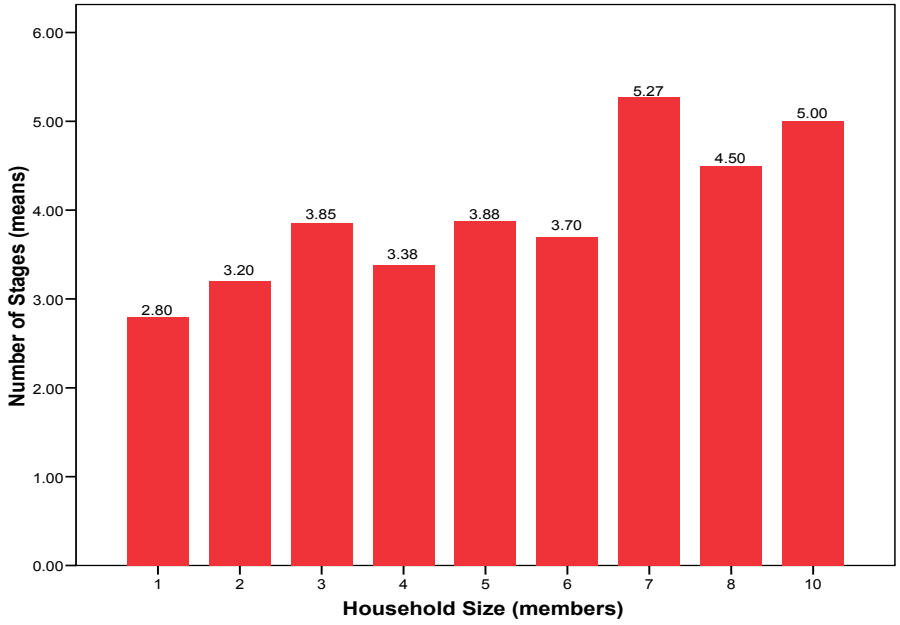


Figure 70. House form total number of stages vs. household size.

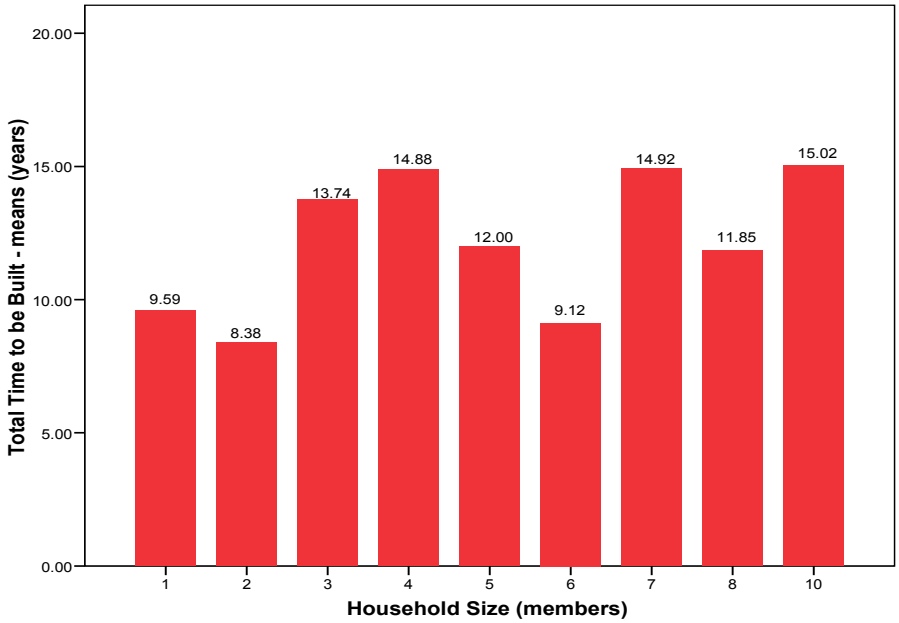


Figure 71. House form total time to build vs. household size.

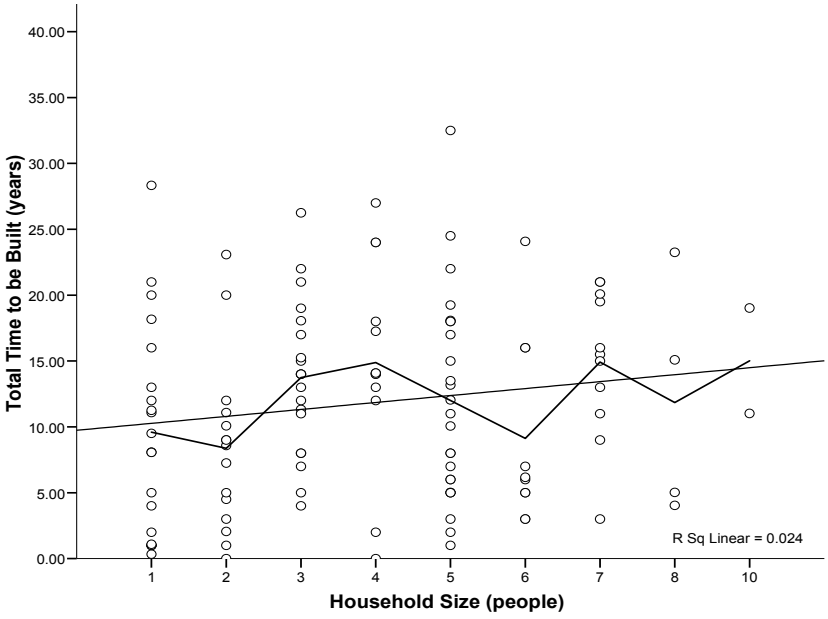


Figure 72. House form total time to build vs. household size (dispersion chart).

But house forms of households with 4, 7 and 10 members took a similar time on average to reach their current state. Correlation showed no significance too (see figure 72).

5.4.2 House Form and Household Composition

This analysis sought for relationships between houseform characteristics and the composition of the household. Means for total covered area, number of stages to reach the present house form, and time taken to complete the current house form increased as household composition became more complex (see table XV). This was consistent in single households, nuclear families and extended families including grandsons (extended 1st type, see figures 73, 74 and 75). House form covered area was higher also for extended households with blood relatives up to a fourth generation including grandparents and great grandchildren (extended 2nd type, see figure 73). Having other relatives in the household, such as nephews, brothers and sisters, uncles and aunts, etc., actually resulted in smaller means for the three characteristics describing house form (see figures 73, 74 and 75).

Table XV. House form characteristics vs. household type

Household type / House form (means)	Single Household	Nuclear Household	Extended type 1 Household	Extended type 2 Household	Household with other relatives
Total covered area (sqf)	1,270.0	1,562.3	1,740.9	2,097.9	1,142.2
Stages to be built (#)	2.5	3.8	4.3	4	2.6
Time to be built (years)	8.5	11.8	14.7	9.6	10.6

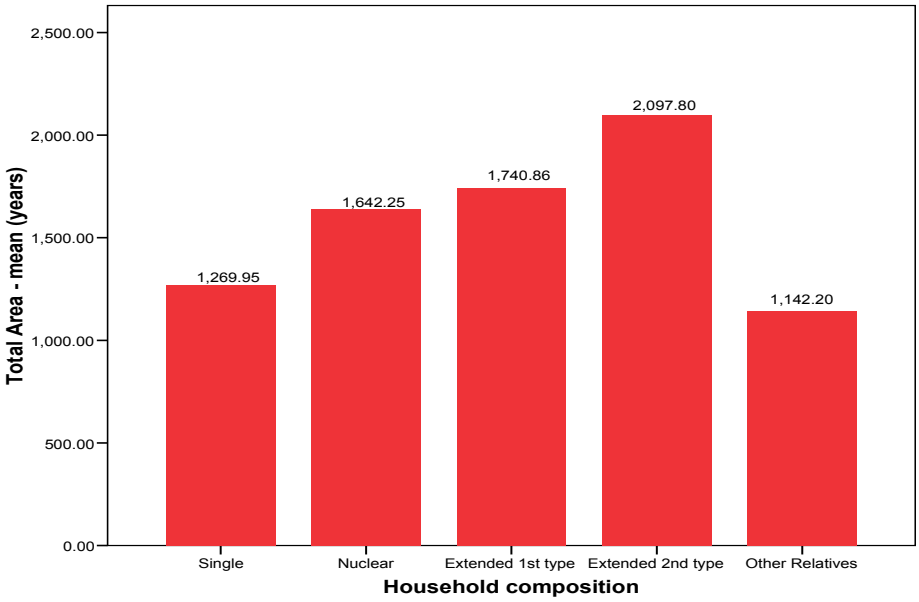


Figure 73. House form total built up area vs. household composition.

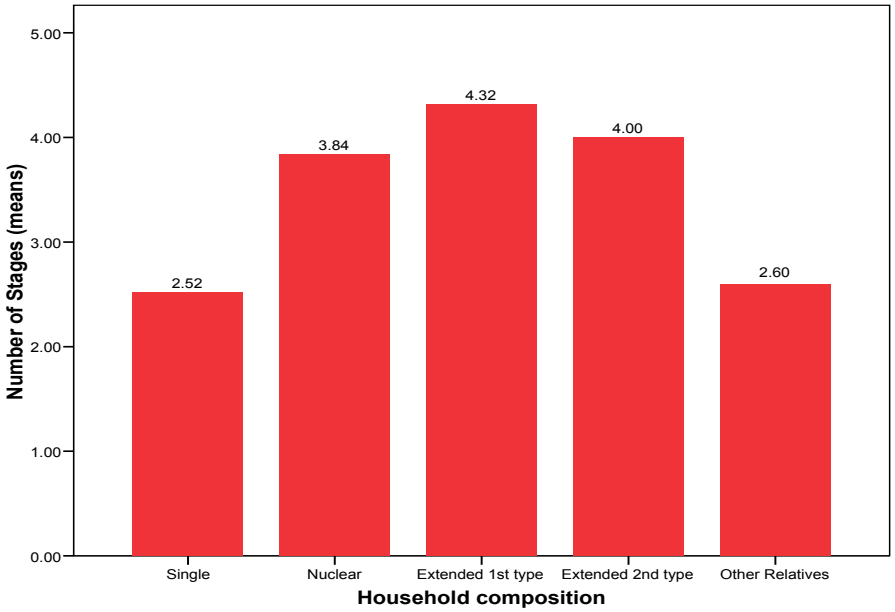


Figure 74. House form total number of stages vs. household composition.

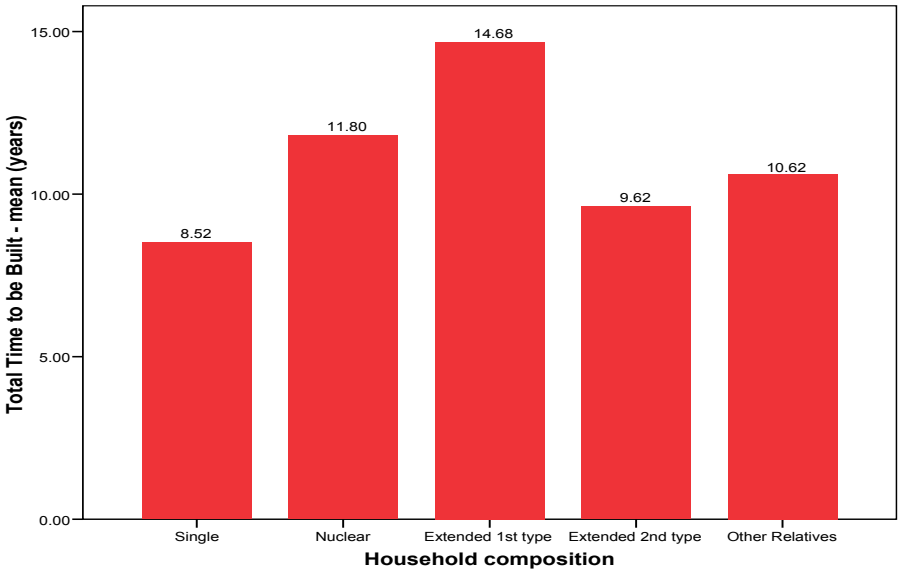


Figure 75. House form total time to be built vs. household composition.

5.4.3 House Form and Household Motivations to Change the House Form

Among the most interesting findings came from comparing the changes made to the house form with the motivations to make house form changes in each of the stages. This analysis had the added interest of looking at how the relationship between house form changes and household motivations changed along the successive stages of house form construction (see figures A31 to A40 in Appendix A).

In the first stage, the three most frequent types of house form change (permanent structures 40%, trailers/manufactured houses 23% and temporary structures 11%) were all built with the purpose of moving-in or occupying the lot. This was reasonable since it indicates the needs for the basic housing of the majority of the new households (see figure A31). During the second stage this relationship became manifold. Attached additions, the most frequent house form change during this stage, were built mainly to improve the living conditions of the household (21% of all the houseform changes in the second stage), but also to accommodate the growing sons and daughters or family (8%), services and facilities (6%), and to provide shade (4%). Detached additions were also built to accommodate services and facilities (8%). Permanent structures were built in this stage by households who had first built some type of temporary structure but had not moved into the lot moved-in to the lot (5%), or to improve the living conditions of households who were already living in a temporary structure (4%). This analysis also permitted identifying a small group of households who were already living on the lot and who brought in a trailer or manufactured house to improve the living conditions of the household (3% of the household changes in the second stage) (see figure A32).

During the third stage, attached additions were equally either to accommodate services and facilities or to provide shade (13% of the house form changes for the third stage each) and, in a slightly lower proportion, to improve the living conditions of the household (11%) or to accommodate growing sons and daughters or family (7%). Similarly, the other most frequent house form change in this stage, detached additions, were built to accommodate services and facilities or to provide shade (4% each). However, the main reason to built detached additions was to generate extra-income (8%). Other relevant house form changes introduced in this stage to improve the living conditions of the household were dividing existing covered space and adding flooring to already built structures (each 4% of all the house form changes on the stage) (see figure A33).

Attached additions in the fourth stage were again motivated mainly by the need to improve the living conditions of the household (14% of the house form changes on the stage), to provide shade (15%) and, in a lower proportion, to accommodate services and facilities or to growing families or sons and daughters (6% each). Detached additions to accommodate services and facilities (5%) or to generate extra income (6%) were less prevalent. Permanent structures were also built in this stage by households living in temporary structures or trailers to improve the living conditions of the household (5%) (see figure A34).

During the fifth stage, attached additions were built to improve the living conditions of the household or to provide shade (each 11% of the total number of house form changes made in the fifth stage). In slightly lower proportion, attached additions

(6%) as well as detached additions (9%) were built to accommodate services and facilities. On the other hand, detached additions were also built to generate extra income (4%) and, for the first time, to satisfy a household's desire although not a particular need (4%) (see figure A35).

Although house form changes became less frequent from the sixth stage on, attached additions were still mainly built to improve the living conditions of the household (15%), to provide shade (18%), and to accommodate services and facilities (12%). Dividing existing covered space (9%) and bringing in a trailer or manufactured house (6%) were also changes to improve the living conditions of the household. Detached additions were also built to accommodate services and facilities in this stage (6%) (see figure A36).

During the last stages, attached and detached additions were the most frequent change made usually either to improve the living conditions of the household, accommodate services and facilities, or provide shade (see figures A37 to A40).

5.5 Key Examples of Housing Diversity

The cases of several households interviewed during the survey are presented in this section. The purpose of portraying these cases is to reconnect the data collected during fieldwork with the meaning of the dimensions measured in this research as well as the less tangible dimensions of the households living in these colonias. The cases have been selected from the sample taking into consideration the house form characteristics described as well as the households depicted. The households and their house forms

presented are good examples of the aspects analyzed by this study and the diversity found by this research. However, they do not represent all the diversity that was seen in this sample of 123 households of ten colonias located to the north of highway 359 in Webb County, Texas. Because the identity of the households surveyed in this study is to remain confidential, names have been substituted by pseudonyms. Addresses, lot identifications, colonias, and all details that connect the information presented with to informants have been removed.

5.5.1 Doña Malave

This household lived in one of the most consolidated colonias studied. Nevertheless, Doña Malave's residence stood out from others because of its two stories and bright presence among most of the unfinished houses of the colonia. The exterior walls of this house were well finished with textured stucco painted in bright yellow. There was a front porch with outdoor seats where two windows and a main central door visually connected with the interior. All the openings of the porch as well as the rest of the house had operable glass windows and wooden doors. The lot was fenced from the street with a chain link fence painted in white. Barbed wire fence defined the sides and rear of the lot. The house was set back about ten feet from the street and eight feet from the barbed wire fence on the left side of the half acre lot. The right side of the lot showed two big chain link gates that could be opened to let cars into the parking area at the right side of the house. The cinder-block walls of and unroofed house approximately twenty-five feet square big was under construction in the rear right quadrant of the lot (see figure 76).

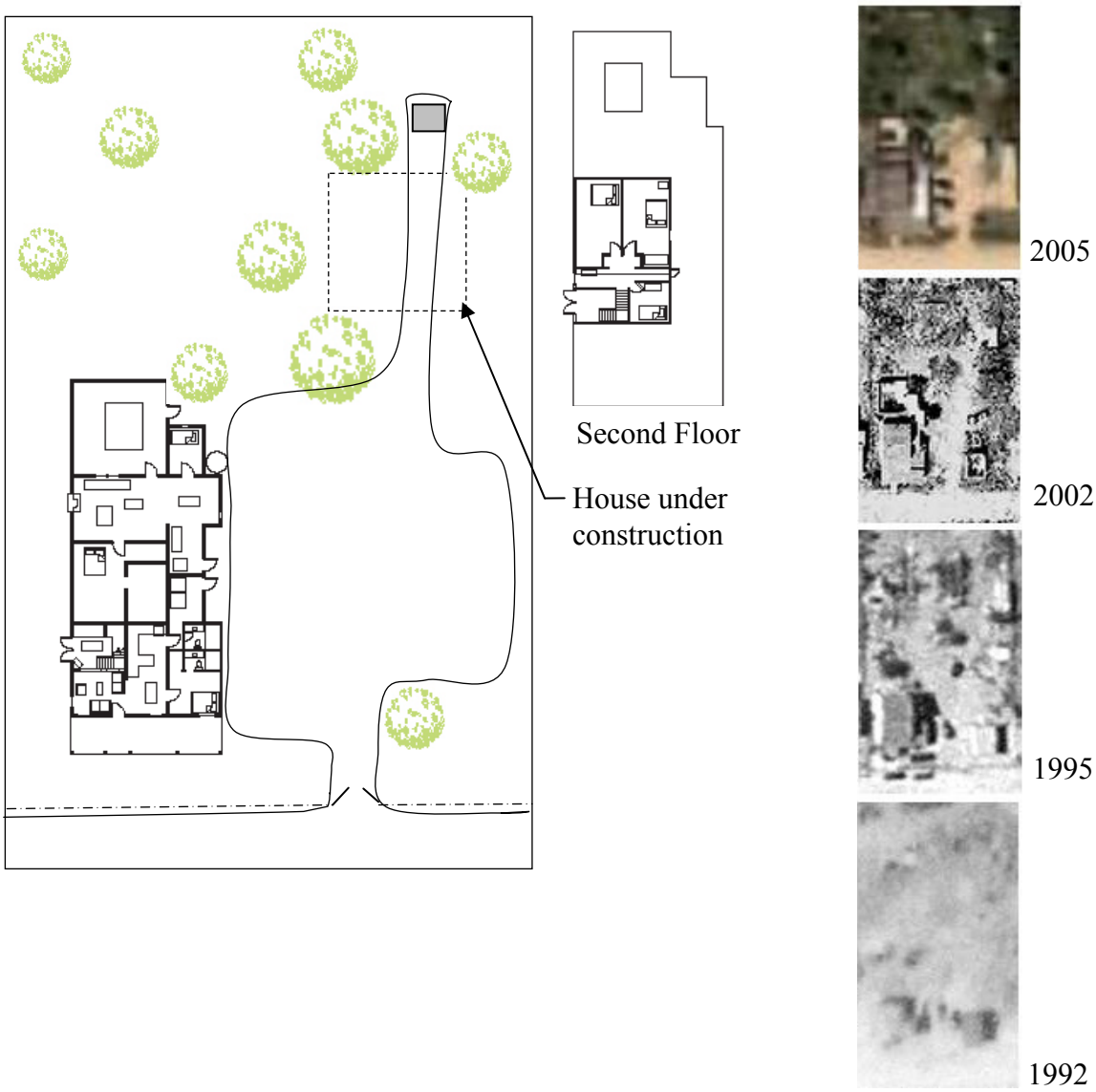


Fig 76. Doña Malave's House

The interview had been arranged the previous day and the household head was waiting our visit. When we called from the fence, Mrs. Malave came out and crossed the porch to open the gate and let us in before we entered her house and sat in the living room. This space was furnished with a white upholstered couch and two sofas arranged with colored pillows. The interior of the house was well finished in stucco and painted in beige colors. Next to the living room, towards the back of the house, there was a formal dining set in a double height space that connected with a stair to the second floor. On the right side of the living room, there was a breakfast area that connected to the kitchen in the right rear side of the house. Further to the right of the breakfast area, there was a large bedroom that was used by Doña Malave and a bathroom to the rear of the bedroom, accessed from the kitchen. Upstairs, there were three bedrooms, two towards the rear of the house and one on top of the kitchen area. The kitchen had an exit door to a laundry room and the parking area that connected to the rear of the house. In the rear of the house, under the bedrooms of the second floor, and with a separate entrance, there was a small apartment with kitchen, living, dining and two bedrooms. Next to this apartment, there was a large fiberglass water tank and a small empty pool.

Mrs. Malave was a single mother who had lived there for the last 24 years. She explained to us that she lived with her husband in another colonia across Highway 359 in what she described as a "nice house". She was a housewife and had never worked outside the home as she was raising their children and her husband had a good job. After a difficult divorce, Mrs. Malave retained the old house and custody of her four daughters. Unfortunately, Mrs. Malave's husband did not warn her that she was also

responsible for the remaining debt of the old lot. About two months later she was notified of faulty payments and corresponding fines. Another two months after unsuccessfully trying to put together the owed sum, she and her daughters were evicted and moved to her sister's house with all their furniture and belongings. She lived for six months there looking for her first job while her sister started taking her furniture as a payment for rent. Desperate, Mrs. Malave used her little savings and money borrowed from her father to buy a one-room used small camper and to give the initial payment of the lot in this colonia. She moved into the lot with her daughters and lived for a year in the camper before her father came from San Antonio to build her a two-room cinder block house. In about three weeks the house was finished and she moved in with her daughters. The space was a tight 484 sqf area but it was a big improvement compared to the old camper. It was pretty much one room to do all the daily activities and another room for all to sleep. There was no bathroom and until she built an outhouse, necessities were dealt with in the open. By then Mrs. Malave had found a job as assistant in a general physician's practice. Within a couple of years, her father had come again to build the first addition, attaching a 242 sqf structure to the rear of the existing one. That second stage reconfigured the house so there was a larger living and dining area, and a separate room, one for the three older girls while the youngest shared the room with her mother. Work went well and Mrs. Malave received training to take more responsibilities at the doctor's office where she was appreciated as a hard working single mother. Thanks to her improved economic stability, Mrs Malave embarked on yet another addition, building a 352 sqf second floor on top of the existing structure. This time the

work was negotiated with one of her brothers. He had just moved to Laredo and offered her to extend the house further to the rear of the plot and built a second floor to add bedrooms in exchange for living in the lower floor of the new structure. Although, Mrs. Malave did not have the time or the knowledge to assist construction, she provided construction materials and hired help for the construction. She also participated in the decisions made to extend the house. She directed her brother to raise the current dining space's ceiling to match the ceiling of the added second floor and to locate the stairs in that space. When the second floor was ready, the girls moved upstairs, each to a new bedroom, and their old bedroom became part of the enlarged kitchen. Later, Mrs Malave attached another 117 sqf structure to the right of the original structure to add the bathroom and move her bedroom. Her old bedroom became the breakfast area of the kitchen. With this addition, she also installed a 1,000-gallon fiberglass tank to store water and built a septic tank behind the house. In the meantime, her first daughter married, and Mrs. Malave asked her brother for the room for the newlyweds. Mrs Malave hired again constructors and attached a 461 sqf structure to the rear and right side of the room to place a kitchen, a dinning, and a 2nd bedroom, completing a small apartment for her daughter and her husband. Shortly thereafter, the third daughter also married and moved to a nearby location, although she kept visiting her mother almost every day. That was when they built the small pool at the back. But a faulty foundation had cracked the pool recently and it has remained empty since. About two years ago, her second daughter married and left for a little more than a year before she returned home divorced, pregnant and with a one-year-old boy. During the days of our fieldwork, the

divorced daughter, who was close to give birth, was taking care of her sisters' children and her youngest sister after school hours. With permission of Mrs. Malave, the first daughter's husband had started construction of a new house in the rear right side of the lot as another apartment for the second daughter (see tables XVI and XVII).

Table XVI. Mrs. Malave house form changes

Year	**1986**	**1987**	**1989**	**1992**	**1993**	**1995**	**2007**	**Total**
Area	96 sqf	484	242 sqf	352 sqf	117 sqf	461 sqf	--	1753sqf
Change to houseform	Small camper	Permanent structure	Attached addition	2nd floor addition	Attached addition	Attached addition	Detached addition	7 stages 11 years

Table XVII. Mrs. Malave household current characteristics

Member	**H. Head**	**Daughter1**	**Daughter2**	**Daughter3**	**G-daugh-1**	**G-daugh-2**	**G-daugh-3**
Age	56 years	36 years	35 years	31 years	14 years	11 years	5 years
Education	H.School	College	H.School	College	H.School	M.School	Element
Occupation	H-Care assistant	Administ	Sales Clerk	House Wife	Student	Student	--

Mrs. Malave described her house like she described her daughters. She took pride in taking care of them by herself from babies to the adults that they were now despite difficult times and hardships. She had worked hard to provide for them and give them what she thought they needed. She was now enjoying living close to all her daughters and grandchildren. Likewise, Mrs. Malave's memories of how she built her house were filled with stories of initiative and resourcefulness. She was as proud of her house as she was of her daughters. Walking in the backyard of the house, between the

old house in the left front quadrant of the lot, and with the new apartment being built in the left rear quadrant, she revealed to us:

> See, these were my plans. I have thought that each of my girls will get one quarter of this lot and each will have her own house here. My older daughter is already building and there is space here for two more houses. My own house will be for my youngest daughter and until God gives me life. They will never have to suffer despair or go through what I had with their children. That's all I want.

Mrs. Malave's initial story was the story of many colonia settlers who lost their home to the deceitful terms of colonia developers due to ignorance of the legal implications of the signed agreements and contracts for deed. It is also the story of how, despite the odds, colonia settlers could stand up, start again and achieve great accomplishments. The case also shows the few housing alternatives available to such a fragile household. Moving into a used camper in a colonia for Mrs. Malave became not only a suitable housing option, but a safe mechanism of progressively improving her family's living conditions as resources allowed and opportunities improved. For Mrs. Malave, after being evicted and lived with a close relative who had no regret in taking her few belongings in such a difficult moment of her life, living in a small camper with her 4 daughters without standard services provided them a safer housing alternative than any other option. The perspectives of being able to improve living conditions for her daughters in the colonia were promising and became an important objective for Mrs. Malave.

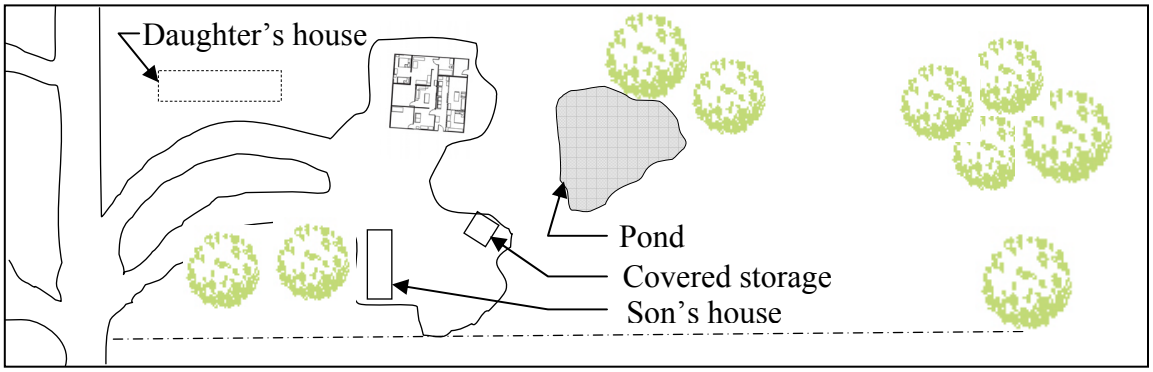
However, the story of Mrs. Malave goes beyond any expectations. Mrs. Malave house construction was self-managed and built to the household's desires and

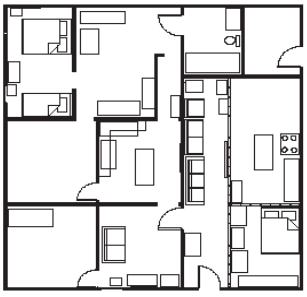
up to high building standards by small but knowledgeable constructors. The house was being enlarged at the moment that the household head decided that more room was a priority among the list of their other needs and when resources to materialize the expansion were available. These needs included providing for her daughters and ensuring their education that would eventually lead them to economic independence. It is hard to imagine that the formal housing sector would have improved this process in user satisfaction and affordability. It may be have been a long process, but it maintained the balance between the household priorities, needs, and available resources that made delivered housing affordable all throughout.

The social networks that helped developing the house form at different times were also part of the social capital that housing in colonias relied on. These social networks involved family members and relatives, but it also involved hired aid and formal workers who provide a needed service and who, in this way, made a living working in the colonias. The process described also reflects how the house form allowed for affordable means for temporary housing to other relatives of the household, Mrs. Malave's brother, who moved from another location, or her returning daughter during times of personal hardships. There was also the built-in capacity of the large lot to accommodate Mrs. Malave's daughters in the future. Besides being an important desire of Mrs. Malave to save her daughters the difficulties and adversities she went through when young, this possibility represented a higher starting point in housing for younger colonia inhabitants in the housing ladder.

5.5.2 Mr and Mrs. Cuenca

Mr. Pedro Cuenca lived in the last house of *S* street (address reserved) at colonia *Z* (identification reserved). The high number of unoccupied lots and their large extension contributed to give this colonia a very rural character. The only neighbor of Mr. Cuenca was a nice big house built on top of a small hill in the lot across the street. The other lots surrounding Mr. Cuenca's were empty and showed no activity although all of them were fenced with barbed wire. Mr. Cuenca's lot and house form reflected also this rural appearance. An unpaved driveway entered the lot downhill to a turnaround. Three structures surrounded the turnaround: a trailer, a main permanent structure with clear sign of extensions as well as deterioration, and a small permanent structure that had been also extended. All the structures had signs of poor maintenance. The trailer was a second hand structure visibly worn out. As we entered the lot looking for the head of the household, a young man who was working under the hood of a pickup truck next to the trailer directed us to the next building in the turn around. Mr. Cuenca and his wife lived in this structure. It was the biggest structure and consisted of an old building with an attached addition (see figure 77). As we parked in front of the main building, Mrs. Cuenca came out for a moment and went back in. As we approached the door, we could see Mrs. Cuenca arranging the house and sweeping the concrete floor inside the house. She greeted us and let us in into a small hall space between the older and the newer structure where there was a big couch. As we begin the interview, Mr. Pedro Cuenca came from a backyard door using a cane and walking with difficulty. We knew later he was recovering from a stroke. He greeted us and discreetly sat in the coach listening to his wife answering and explaining us how they came to the colonia and built their house. This household showed very humble origins. Mr. Cuenca had completed elementary but Mrs. Cuenca was illiterate.

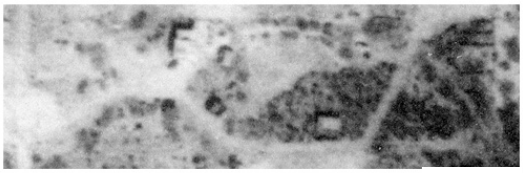




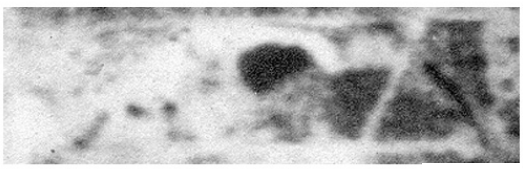
2005

2002

1995



1991



1983

Fig 77. Mr & Mrs Chuecos's House

They came from Nuevo Laredo 35 years ago and they rented in several places before they knew about this colonia and made the first payment for their lot. They seemed very poor as shown by the worn-out furniture and few belongings we saw during the interview. They were already a full household when they came: two adults and three children, although the youngest child was born in the US. The initial house was the older structure next to the space we were in. It took them about a month to complete it while they lived and slept in the open. It was a conventional wood frame structure built by Mr. Cuenca and his older son. It had a basic layout of three rooms. One half of the floorplan were two bedrooms and the other was a longer room for the kitchen, dining and living areas. It did not include a bathroom and those personal needs were taken care in the *"monte"* (bushes) surrounding the house at the beginning. They built and finished the exterior side of the walls, but the interior side was unfinished and exposed the wood frame. A bathroom was built some years after behind the original house in a concrete block attachment that included another bedroom to separate the younger children from the older son. A big roof next to the house was the most recent improvement made to the house form. It was initially an open porch used mostly during for day activities because of the severe heat of Laredo. It was the roof covering the hall we were in and the two newer rooms next to the hall. Years later, they enclosed the porch with walls and installed framing divisions for future partitions between the hall space and the two rooms, but the sheet rock was not installed at the time of the interview. "We build all this before the accident" Mrs. Cuenca said, referring to her husband's condition. "And we have not finished it yet".

As the older son grew up and married, he brought his partner to live in the lot and they built a small two-room house next to their house. He later expanded that house to add a dining-kitchen area. The house's exterior walls and roof were wrapped in asphalt-

coated paper nailed to the house as the exterior finishing. The older daughter had also married and left the household, but came back home years later divorced and with two children. She was currently living with a young man who Mrs. Cuenca described as a "good working man". This was the young man working in the pickup we met as we came in. He worked in construction and, in fact, was building a perimeter wall in a lot of one of the industries on the same colonia. He had asked permission to Mr. Cuenca to bring a used trailer he bought and placed close to the lot access, next to the main structure. They were living on it with the two previous children from Mr. Cuenca's daughter. The older son was also living with his daughter in the small house, but his partner had left them about two years ago (see tables XVIII and XIX). The accounts of Mrs. Cuenca were sprinkled by Mr. Cuenca's details and specifics about how things got built. The conversation took an interesting turn when we talked about how many small investments were made by them to build their house. When asked if they could quantify the cost of all these improvements, Mr. Cuenca grinned and said in a reflective tone:

> many people have asked me if I know how much this house is worth… To all I had given just one answer.

He went into explaining how his house was product of the numerous opportunities in which people had turned to help them and then added:

> Just yesterday… this man from the water agency who is such a nice person came because I have been asking him to help me installing a drain for the washer. I wanted his help, but I did not want to abuse his generosity. I thought he was already being generous coming to help me in my condition. So, I wanted to pay him for his labor and the materials that were needed. But he came, saw what was needed, and left to come back later with the materials and in two hours, he had installed the new drain. I insisted in paying him, but he rejected my offer saying that he was pleased to do the work. 'It was nothing he said.' Well, nothing…, for me it was really important! I could not have done the job in my current condition!

And it has been like that many, many times. I have been blessed with people that have helped me to build this house doing many small things here and there that meant a world to us. So when somebody asks me how much I think my house is worth I imagine that they may think it can't be a lot. They see that we are poor and we don't have much. You see, the house is still half finished and I hope I can live to see it completed. But this house to me is worth all the people that had helped me throughout my life! I see things here and there and I know the story of all of them and what each represents to me. How can I put a price in the good faith and actions of all the people who has helped us?

Table XVIII. Mr. & Mrs. Cuenca house form changes

Year	**1983**	**1985**	**1987**	**1990**	**1997**	**2001**	**2002**	**2003**	**Total**
Area	576 sqf	384 sqf	192 sqf	80 sqf	168 sqf	384 sqf	480 sqf	80 sqf	2344 sqf
Change to Houseform	Permanent structure (1st house)	Attached structure (1st house)	Detached structure (2ndhouse, older son)	Attached structure (1st house)	Attached structure (2nd house)	Attached structure (1st house)	Divide int.area / Trailer (3rd house, daughter)	Attached structure (1st house)	8 stage / 20 years

Table XIX. Mr. & Mrs. Cuenca household current characteristics

Member	**H. Head**	**H.Partner**	**Son**	**Daughter**	**Son InLaw**	**G.daugh-1**	**G.son-1**	**G.son-2**
Age	67 years	65 years	30 years	26 years	24 years	14 years	5 years	4 years
Education	Illiterate	Illiterate	H.School	M.School	H.School	M.School	--	--
Occupation	Retiree	Housewife	Mechanic	Housewife	Constructor	Student	--	--

For the Cuenca household, living in this colonia had represented opportunities that they would have hardly had if living in a low-income rental facility in Laredo. For the Cuenca, all these years in the colonia represented an affordable housing alternative for them and their children that allowed the household matching available resources and housing expenditures, developing a network to support the improvement of their housing, reducing uncertainties for them and for their grown up children in unexpected

situations and emergencies, and investing their scarce resources while still building capital.

It is not difficult to imagine that the opportunities for a disabled person to afford conventional housing in the formal market would be limited at best. It is unlikely that low-income rental housing would have provided the conditions to permit the Cuenca household reducing their housing expenditures to a minimum as they went through hardships and, on top of that, allowed them to help their children through difficult times after they became adults by helping making their housing affordable. Here again was the concern of the household for easing the path of their sons and daughters as they gained economic independence or helping them out in times of trouble. Being able to stay in one place, as opposed to having to move to cheaper housing when resources became scarce was also very important to maintain the social networks and the economic capital already created.

The housing conditions of the Cuenca's were far from desirable and could largely be improved. The structures were incomplete and deteriorating and it was unlikely that Mr. and Mrs. Cuenca would have the resources to finish the housing structures any soon. However, that did not prevent that small upgradings were made as needed. Ownership was a strong motivation to invest, even if few, the available resources in the most needed repairs. Mr. Cuenca was clear that these investments benefited them and his son and daughter who would eventually inherit the property and were already enjoying of a higher starting point than they did. In this sense, the large dimension of the lot permitted that the old household was renewed with the newer house structures of the son and the daughter, as well as the new son in law. These household members represented an addition to the household capacity to keep and improve the house form while housing savings could be made.

5.5.3 Mr. and Mrs. B. Benitez

The Benitez were a couple in their early 50s. They came to their colonia 13 years ago with their two children: a boy and a girl. They came to take care of Mrs. Benitez's mother who was going through a long term health affliction that did not seem to get better. Mrs. Benitez's mom had been living in a used three-room 42 feet trailer that she bought when she gave the down payment of her lot. She had kept up with the monthly payments but she was starting to have problems because it was getting difficult to keep a steady income due to her bad health. The Benitez had been renting in Laredo and they thought they could help her mother by moving in with her and contributing their rent for the monthly payment of the lot. The trailer was deteriorating and was a little small for five people. The living-dining-kitchen space was enough for the five of them. But the girl slept with the Benitez in the master bedroom while the boy shared the other bedroom with his grandmother. Mr. Benitez was a handy welder and started repairing the old trailer soon after they moved. He also built a fence around the lot out of scrap metal sheets discarded by a maker of brake pads. He later built a roof in the back yard of the lot to store the acetylene and oxygen bottles and his welding gear. He also started talking small jobs at home such as repairing the rusted bodies of home appliances (stoves, fridges and air conditioning units). Eventually, Mr. Benitez built a big underground tank to store water and set a pump system to bring water to the trailer. About two years after coming, Mrs. Benitez's mom got better and suggested her daughter and son-in-law to build their house in the lot so they could be more comfortable. Mr. Benitez did not agree to build in land that was not theirs. But since the business was going well he decided it was time to look for a lot around in the same colonia. Mrs. Benitez mom was so grateful to her daughter and son-in-law that told her daughter that she wanted the lot to be theirs. She only requested to stay in the lot living in the small trailer.

Mr. Benitez, a very correct man, did not accept the offer. But since they were looking for a lot in the same colonia they eventually proposed to buy the lot from Mrs. Benitez's mom keeping the trailer for her. Then Mr. Benitez started building his house. He set the trailer on the left side of the lot and built a wood frame structure with three rooms. One of them was used for the kitchen and dining areas. The other two were for the Benitez and their two children. In the right side of the rear of the house there was a bathroom and a utilities room. A septic tank was also built and the outhouse was dismantled. Soon after, the boy and the girl started asking for separate rooms and Mr. Benitez attached two rooms to the front of the house. One of them was next to the kitchen-dining area and became the living room. The other was a room with a bathroom that became the master bedroom, so theirs was freed for the girl. The last addition to the house was a large front porch to provide a shaded area to sit and meet with friends (see figure 78). Eventually, Mrs. Benitez mom went to live with her youngest daughter who had just given birth. Mrs. Benitez started working in the Larga Vista Community Center, initially volunteering, but two years ago she was hired by the center to help in their programs. The boy of the Benitez graduated from high school and started working. He married soon after and asked the parents to move into the old trailer with his wife. The Benitez's daughter was the next to marry and move out. She moved nearby and stayed in close contact with her parents. Mr. Benitez had been doing very well in his job. He specialized in repairing used trailers for the dealers of Laredo. Trailers were brought to his lot where he reinforced the structures and substituted external or internal metal siding and details. Then trailers were taken to paint and to fix doors and woodwork. Mr. Benitez grew his business and he built a detached shed to keep his tools. Soon after the oldest son moved to the trailer, the Benitez had their last son. Eventually, the older son and his wife moved out to a new home in a subdivision nearby.

Fig 78. Mr. & Mrs.Benitez's House

The Benitez, who always sought the opportunity to help their sons and daughter like Mrs. Benitez's mom had helped them, felt disappointed that their older children showed no interest in staying in the lot. Mrs. Benitez asked herself why his son moved to an expensive subdivision when he could have built his house right next to theirs. At the time of the interview they had been considering to rent the trailer and start raising a fund for emergencies and for future investments. They were also concerned with their eventual retirement and elderly. At the time of the interview, Mrs. Benitez had just gotten a job with the local ISD and was very excited about the health benefits that her work had. Mr. Benitez had started enlarging the living area of the house by taking some of the porch area (see tables XX and XXI).

Table XX. Mr. & Mrs. Benitez house form changes

Year	**1994**	**1994**	**1997**	**1999**	**2001**	**2004**	**2006**	**Total**
Area	480 sqf	--	936 sqf	280 sqf	238 sqf	20 sqf	336 sqf	2290sqf
Change to houseform	Trailer	Repairs Water & septic t.	Permanent structure	Detached addition	Attached addition	Attached addition	Attached addition	7 stages/ 12 years

Table XXI. Mr. & Mrs. Benitez household current characteristics

Member	**H. Head**	**Partner**	**Son**
Age	53 years	49 years	15 years
Education	Elementary	H.School	H.School
Occupation	Welder	Housewife/ social work	student

The Benitez are an example of relatives who joined an existing colonia household as an affordable housing alternative, but also as a way to contribute to the housing expenditures of an existing household. Thus, beyond helping her mother personally, by coming to live with her Mrs. Benitez was also helping her economically through a difficult period. Due to her prolonged illness, it is not difficult to imagine that

it would have been difficult for Mrs. Benitez's mother to keep up with a rent or her lot payments and it is likely she would have been in danger of losing her property. They later bought the lot and made relevant improvements to the existing house form. The lack of adequate on-site services and living space were rapidly addressed by Mr. Benitez who built a water storage and a septic tank and later, and other residential structure. The lot became also place for Mr. Benitez workshop. Mr. Benitez was a semiskilled worker who was also able to develop a service in the housing market by repairing used trailers. His job had an impact increasing affordable housing alternatives available to colonias.

Again, changes to the house form were made in a timely manner, balancing the available resources and the desires and needs of the household. Investments were progressively made in both, the residential structures and the working areas of the lot as deemed relevant and without risking the property. But housing for the Benitez involved more than their shelter. Among the ultimate objectives of the Benitez was helping their kids to have a higher entry point in the housing ladder. This realized in a different way than planned. As other colonia inhabitants, they thought their lot was big enough to have their sons building their houses there. When the time came, however, their daughter married and left. The older son lived in fact in the old trailer, but only for a while after he married. When he saved enough to buy in a formal subdivision he left. The Benitez thought that, like them, their son could have done much more building in a colonia than buying in a formal subdivision. Furthermore, being close to them would have also given them a sense of security now that they were approaching their 50s. That was what they did when they came to live with Mrs. Benitez's mother. Although disappointed, the Benitez saw their extra space as an opportunity to invest in securing their future. By the time of the survey, they were already working in the idea of renovating the trailer and putting it for rent.

5.5.4 Mrs. Escalona

Mrs. Escalona lived in colonia v (reserved identification) in a large lot to which they moved 14 years ago with their two boys. Their lot was near the end of street j (reserved address), next to several other occupied lots. Mrs. Escalona's husband had bought the lot with his two brothers and a sister. They divided the lot into four sub-lots in which to build their houses. Mr. Escalona's house was without doubt the largest and more consolidated one. It had two stories and a large car port in the front of the house. We waited in the street until Mrs. Escalona came out and invited us in. We entered into the front body of the house where living and dining areas were located. We sat in the dining table as Mrs. Escalona explained that we were actually in the first house built when they initially came. It was a cinder block structure of about 30 feet wide and 10 feet deep. The roof was made of wood and it was built by her husband and his brothers. She explained that they moved into that structure and lived there for about two years. Initially, it had no windows and they covered the openings with plastic sheets, but rainwater still came in. Half of the initial structure was used for daily activities and the other half was for sleeping of the marriage and the two boys. But since Mr. Escalona was a contractor in the construction business and spent long periods working away from home, Mrs. Escalona spent so much time by herself and she liked having her sons sleeping with her. The first addition made to the house form was doubling up the area attaching two rooms towards the rear of the first building. The new structure was also made of concrete block and covered with a concrete floor slab because Mr. Escalona was already planning to build a second floor. One of the new rooms became the boys' bedroom and the other the Escalona's master bedroom with a bathroom inside. As sometime passed they had another son who shared the room with them while he was a baby. The next house form improvement was adding another bathroom, a laundry area

and a concrete staircase to reach the un-built second floor. Eventually, a wood framed structure was built on top of the second addition with three bedrooms and a new bathroom for their children. The bedroom of the boys in the ground floor became the kitchen and the dining expanded over the originally shared area (see tables XXII and XIII).

Table XXII. Mrs. Escalona house form changes

Year	1993	1994	1997	1998	1999	2002	2006	2007	Total
Area	360 sqf	534 sqf	210 sqf	256 sqf	352 sqf	500 sqf	96 sqf	80 sqf	2388sqf
Change to houseform	Permanent structure	Attached structure	Attached structure	2nd floor addition	2nd floor addition	Attached structure	2nd floor addition	2nd floor addition	8 stages 13 years

Table XXIII. Mrs. Escalona household current characteristics

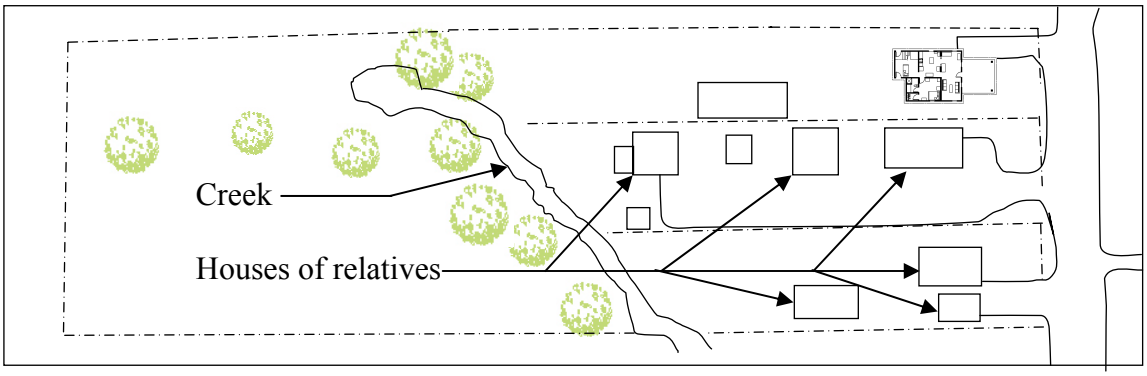
Member	H. Head	H.Partner	Son 1	Son 2	Son 3
Age	48 years	48 years	17 years	15 years	12 years
Education	Elementary	Elementary	H.School	H.School	M.School
Occupation	Construction contractor	House wife	Student	Student	Student

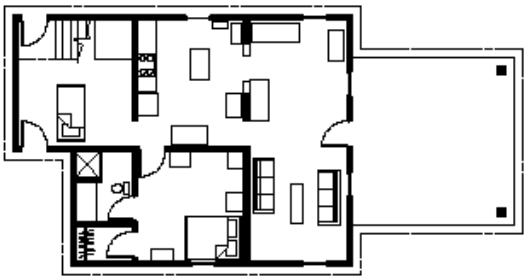
The house was well kept and maintained. Exteriors and interiors were well finished and painted. Floors were tiled in the lower floor and carpeted in the second. Furniture and belongings around the place, as well as electronics and appliances indicated that this household had a steady a better-off economic position among colonia inhabitants. Mr. Escalona was in one of his long trips at the time of the interview, but they stayed in touch and he had authorized his wife to give the interview. Mrs Escalona was a busy housewife. She kept up with the housework and drove her children and nephews to and from school. After our interview, Mrs Escalona had to pick the children up and bring them home while their parents were still at their jobs. Their lot had also a shed for tools and storage, chicken cots for the household eggs, and a corral with a calf in the backyard. The last addition made to the main structure was a large porch area in

the front of the house. They built a roof and a concrete floor to protect the house front side and entrance from sun and the rain. Mrs. Escalona explained how muddy the front yard was during the rainy season. The porch was also used to spend the afternoons outdoors on the shade (see figure 79). For Mrs. Escalona this was exactly what her husband wanted for her and she liked it. She thought she was living in her dream house.

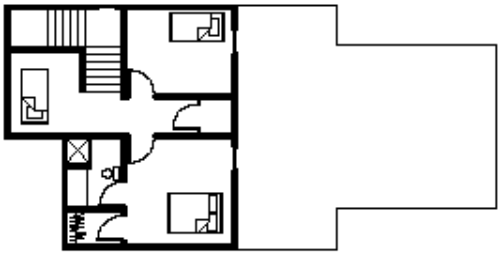
The Escalona are one example in which several households purchased a large lot with the intention of subdividing it in an equal number of smaller lots. The resulting sub lots were still big enough to have fairly large structures for each of the households and complementary activities such as raising birds and other animals. The residence of the Escalona was also an example of how good construction and space standards can be made affordable to households by progressive self-managed construction mechanisms. The first structure was built by Mr. Escalona and his brothers. The successive additions were made by construction workers hired by Mr. Escalona, who became a construction contractor. Like in Mrs. Malave house, skilled construction workers were hired in colonias by the better-off inhabitants while the household retained the management of the process. Mrs. Escalona made clear her satisfaction with the resulting house form.

The possibility given by the large lot in the colonia to house Mr. Escalona and his siblings was very positive to share some of the most difficult tasks of coming to live in a colonia. In a moment in which social organization did not exist because there were not many neighbors living in the colonia, the Escalona had already a small community to share and help each other. As reported by Mrs. Escalona, their first modest structure was built with the collaboration of her brothers-in-law. Under her responsibility were the children of the four related households while their parents worked. Being able to come to live as a small community in a colonia was an important part of helping each other and sharing problems that otherwise could be difficult to solve for low-income inhabitants.





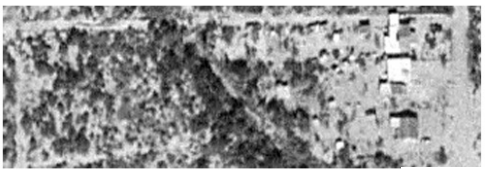
Ground Floor



Second Floor

2005

2002



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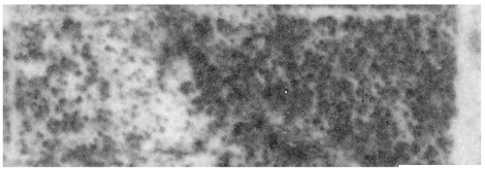
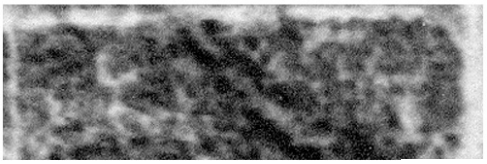


1991



1983

Fig 79. Mrs. Escalona's House

The Escalona's household shows also how the improvements made on the house form balance the household's priorities and needs with their capacity to afford these changes. The primary residency initially built that barely housed the 4 household members was increased over time as the Escalona's sons grew up and demanded more space and privacy and the Escalona's economic situation improved. The direct connection between priorities, house form changes and affordability stand out in the Escalona's household.

6. DISCUSSION OF FINDINGS

This research identified patterns by which house forms in colonias were initially built, enlarged in covered area, improved in quality and continuously consolidated towards completion. The study of these patterns began by looking at the way the land in colonias was initially occupied and used, and continued with recognizing the range of paths followed in the initial construction and completion of the current house form. Similarly, the diversity of households that came to live in colonias were differentiated according to their characteristics, composition, and their motivations to built, improve and consolidate their houses. Finally, the research also sought to identify consistencies in the connections and relationships between the identified patterns of house form and household. This section summarizes and discusses the findings of this study.

6.1 On House Form Patterns and Changes

6.1.1 Un-built Lots in Colonias

A substantial portion of lots in our colonia sample remained un-built. A smaller part of housing built was later abandoned. Even though the number of unoccupied lots (abandoned and un-built lots) was relatively large (35.6% of the total lot provision), only un-built lots made up 33.6% of the land available. This large proportion of empty lots in colonias could be thwarting the overall development of colonias and it represents a problem in several ways.

Despite that no attempt to build on or use these lots has been made, the fact that the great majority of unoccupied lots were fenced and some even gated, cleared and well kept indicates that somebody was attending to these lots. In conversations about the beginning of the colonia, several household heads brought up how the large number and random location of empty lots dividing portions of the colonia was an obstacle to develop a sense of community. Some household heads suggested that dispersing inhabited lots might have been a deliberate action by colonia developers to make social organization and claiming for services difficult. There was also the possibility that land developers or purchasers of these lots kept them to benefit from land revaluation as colonias progressed and consolidated. Today, however, legislation prevents sales of unserviced lots and it is likely that owners who don't have the desires or resources to build are stuck with their lots. There is no doubt that the amount of lots that remain unoccupied in colonias are slowing the process of colonia consolidation and, in some cases, actually preventing it.

With a similar consequence, ranches in these colonias affected also colonia development. Even though, the number of ranches was small, these were the largest lots in these colonias. Some ranches were as large as 20 acres, thus creating large uninhabited areas that were unlikely to receive infrastructure or services in the short and middle run because of their rural character. Although, ranches were not included under the category of unoccupied lots, their impact on the land they occupy had also the potential to prevent the development of colonias.

6.1.2 Residential Lots in Colonias

Colonias consist mainly of residential lots (80.7%). This study showed that most of these lots have one main built structure that typically houses one household of varied compositions (66.8%). Another group of lots had more than one main structure that housed more than one household each (13.9%). A small number of the last were arranged in housing compounds or clusters of several main structures sharing an access to the lot and certain common areas (5.8%). But a majority of the multiple structure lots (8.1%) were divided into sub-lots of similar size with one main structure each. The survey showed that each of these structures housed an additional household. This internal subdivision of lots added 71 new lots to the initial lot provision increasing the residential capacity of the colonias surveyed by 7.4%.

When this information is analyzed together with findings about household structure and household size, this study finds that, despite the diverse composition of households (which include relatives and members of the extended family), colonias are more frequently inhabited by households with an average of four members or less related by blood (mostly sons and daughters). In addition, lots that house more than one household either in clustered arrangements or in sub-lots within the original lot are increasing the residential capacity of land. As a consequence, the initially rural character of the half acre and larger lots is changing by the densification created by this on-going process of multiple-occupancy of lots and lot subdivision. Some of the outcomes of this process can eventually be problematic. For instance, sub-lots in the half acre lots of colonias such as San Carlos I ended up being sizeable lots of 10,890 square feet, but

with frontages of 35 feet and even a few feet less in some colonias. Using the standard model of detached housing that characterizes suburban housing in North America, this may be small. Required side setbacks could make structures too narrow to be useful. However, subdividing corner or larger lots produced lots of good area with the possibility of independent accesses. This process carries no visible negative consequences and brings to colonias an environment similar to urban like neighborhoods and residential subdivisions.

6.1.3 Economic and Productive Activities in Residential Lots

There was a small number of lots that included economic or productive activities in addition to the residential use (3.8%). Some of the most common activities included workshops (welding), services (hairdressing) and retail (grocery store). The survey also showed house forms with structures devoted to raise farm animals and poultry. Although small in scale, these activities have been identified on informal low-income housing as means to obtain goods or supplementary incomes for the household.

6.1.4 Progressive Development and Colonias Housing

This research identified patterns in the time taken to build the house form, in the number of stages used to build the house form, in the type of changes made to the house form in each of these stages, and in the time taken on each stage to complete each type of house form change.

In the ten colonias of Highway 359 included in this study, time taken to reach their current stage varied from household to household. A general overview shows that:

-. Approximately 5% of current house forms were completed in a few months.

-. Almost 25% was completed between a year and 5 years.

-. More than 40% of house forms were completed between the 5th and 15th year.

-. The remaining 25% took more than 15 years and less than 25 years

-. A little less than 5% took 25 years or more

Looking at the number of stages taken to complete the structure, the research found that most of the households completed their house forms in three to six stages. Two or less stages, as well as seven or more, were less frequent. Again a summary of the number of stages taken to reach the current house form shows that:

-. Only 2% of the housing was built in one stage

-. 7% went to an additional 2nd stage

-. 42% took 3 or 4 stages

-. 36% took 5 or 6 stages

-. 13% took 7 or more stages (up to 10)

In terms of the initial structures built and the changes made to them later, this research consistently found that certain house form types were more frequently built than others. Similarly, certain changes made to house form in the successive stages were more frequent than others. This is summarized in the following distribution:

-. A majority (55%) of households began building a permanent structure to be added upon later.

-. A second group (31%) set up a trailer or manufactured housing to live in.

-. A third group (11%) built temporary structures to be replaced with more permanent houseforms.

-. Most of the successive changes on the houseform in the latter stages were attached and detached additions.

-. Trailers and manufactured housing were brought in as a third option mainly during 2nd and 3rd stages.

-. Other improvements were made later, mainly dividing existing covered space.

Finally, patterns on the time that each type of houseform change took within each stage were differentiated. The most relevant finding for all stages was that house form changes that involved increasing the amount of covered area were made more frequently and rapidly than any others. Other findings relating stage, house form change, and time taken to build are:

-. In the first stage, trailers were brought into the lots within a year after purchasing the land, permanent structures and temporary structures were mostly built within two years.

-. Between the 2nd and 6th stage, the majority of the most frequent house form changes identified (attached structures, detached structures, and permanent structures) were all built within two years after completing the previous stage.

-. Between the 7th and the 9th stage, the most frequent house form changes (attached and detached structures, trailers, and dividing covered space) occurred more frequently within one and four years after completing the previous stage.

6.2 On Household Patterns and Household Changes

6.2.1 Household Demographics

The average age of colonias inhabitants was 30 years. The median age increased from 22-24 years in 2000 to 26 years for the group surveyed by this study. This increase of 2 to 4 years of age in a 7-year period suggests that younger inhabitants have been moving into the colonias as some of the older household members had died or moved out. The survey identified some of these younger newcomers are the descendants of existing households moving back with their parents to live in different house form arrangements, or moving into other lots sometimes purchased with their parents assistance. The other, interpretation for the slow aging of the colonia comes from analyzing the number of children growing up in colonias. Inhabitants under 18 represented 36% of the sample researched. Almost half of these minors were born during the last seven years (16.38% of the total). They are children and grandchildren of the household members counted in the 2000 census.

The majority of the population had educations levels between elementary (31%), intermediate/middle school (11.2%), and high school (35.7%). Some inhabitants had studied at the college level although they did not necessarily earn a degree (7.6%). A small group did not have any education (12.9%) of which most were children (8.7%). Although, this study did not have data at hand about the previous education level of settlers in these colonias, this study shows a higher level in younger generations than older ones. Occupations of younger generations are also becoming more skilled.

6.2.2 Household Size

The research registered a decrease from 4.15 to 3.97 members in the average size of the household during the seven years since the 2000 census. We interpret this change reflects children that left the household as they grew up and moved out. Since the most frequent household sizes were 3 (16.3%) and 5 members (20.3%), this decrease in the household's average size possibly indicates a decrease of the bigger households. This deduction is consistent with the increase from 9.76% to 19.51% of single member households observed during the same period.

6.2.3 Household Heads

The survey also identified that the average age for household heads was 51.35 years, but the youngest was 22 years old and the oldest 85. These younger household heads were children raised in colonias themselves and their partners. But these are not the younger generations who stayed or came back to their household of origin, but young people who were starting new households. This was consistent with the reports of households who purchased lots near their own for their married sons and daughters. This is an indicator that colonias are continuing to be an option for new households looking for housing.

The majority of the household heads (70%) came from different places within the state of Texas. Most of them had already lived in Laredo (69%) for an average of 9.66 years. Some had even lived in the same colonia (9%) before they moved to their current

lots. The remaining household heads came from other US cities (12%) and from Nuevo Laredo, Mexico (18%).

The majority of households were headed by males (78%). The 22% of female-headed households made up for almost all the single-headed households. Most of the household heads had attended either elementary (34.6%), intermediate/middle school (9.3%), or high school (34.6%). Some of household heads had college studies not necessarily resulting in a degree (10.2%). Still, a small group had no formal education (6.8%). Partners of the household heads showed similar proportions in their education levels.

6.2.4 Household composition

The research found that households in colonias are primarily composed of the head, the head's partner, and their sons and daughters (65%). This group does not include other relatives or members. However, several of these sons and daughters of the head are adults that have either remained or returned after being away for some time (i.e.: due to marriage, military service, or college). Additional members that were considered permanent members of the household included grandchildren, parents, in-laws, brothers, sisters and cousins. Even though members other than these were not mentioned during the interview, people may have overlooked including people who stayed in the household temporarily. Interviewees may have also withheld information on additional members because current urbanization standards and policies

conventionally interpret a single family household as a nuclear family, thus discouraging the inclusion of extended family members.

Since the majority of the household members were sons and/or daughters (64%), grandsons and/or granddaughters (16%), and sons in-law and/or daughters in-law (10%), the mobility of them in and out of the household had the highest impact in the household structure. This finding is consistent with the previous findings about the younger generations of colonia inhabitants and the number of young adults who stayed or returned to live in colonias.

6.2.5 Household Motivations to Change the House Form

The study found consistency in the reasons and motivations that households gave to build or set structures on the lot and, later, to make successive changes to them. These motivations respond to very logical rationales on how to use the limited resources available to improve the living conditions of the household.

-. To occupy the land or to move in was the most frequently provided reason to build or set the first structure on the lot. While moving in was clearly a need, to occupy the land was a way to signify activity and the unavailability of the lot while the household lived in another place.

-. The desire to improve the living conditions of the household and to accommodate services and facilities were respectively the first and second most frequent reasons given to make improvements between the 2nd and the 7th stage.

-. The need to accommodate growing sons and/or daughters and other family members was the third most important reason to make changes to the house form during the 2nd stage. Between the 3rd and 8th stages, providing shaded areas was the third most important reason provided by households to improve their house forms.

-. The motivations to change the house form in the remaining stages were varied in type and relevance probably more related to the households' priorities and needs.

6.3 On the Relationships Between House Form and Household

The analysis seeking relationships between house form and household characteristics showed no consistency. The more reasonable assumptions suggested by the literature relating house form to households, such as the connection between size of the household and size of the house form, or number of stages and time to complete the current house form showed no significant correlation.

The data showed connection between the household composition and the characteristics of the house form. Single member households and households with lateral relatives of the household head (siblings, uncles/aunts, nieces/nephews, in-laws) had smaller house forms that were built in less stages and time than nuclear or extended households with direct relatives (parents, grandparents, grandchildren).

This finding was also inconsistent with some of the reasons given by households to change their house form, such as growing family and children, accommodating exiting or incoming relatives, etc. If house form and household in colonias are related, as it still seems logical to assume, the sample used in this studio did not support it in its

entirety. The analysis of the relationships between house form changes and the motivations expressed by the household head to make those changes added more information on this.

6.3.1 House Form and Household Motivations to Change the House Form

Unlike the previous analysis, data collected for these variables could be contrasted stage by stage as the house form progressively reached its present appearance. The interpretation of these findings was unambiguous when the different house form changes had the same motivation for most households. For instance, although some house forms are initially more frequently built than others (permanent structures 40%, trailer/manufactured houses 23%, and temporary structures 9%), all of them were consistently related with the household's need to move in or to show occupation

However, when the house form changes and household motivations diversified into several types, then associations between specific house form changes and household motivations started to show. A summary of the most important associations follows:

After the initial stage, *permanent structures* were built *to improve the living conditions of households* living on temporary structures or *to move in* if the household's first structure was built as a sign of occupation while living somewhere else. Thus, permanent structures accounted for a low proportion (4%) because they usually replaced the few temporary structures initially built. Permanent structures were also built in latter stages to improve the living conditions of households who were still living in trailers or

other temporary structures (11% in the 2nd stage, 5% in the 3rd stage, and 4% in the 4th stage).

Building *additions attached* to the existing structures of the house form throughout the next stages of construction were the main way *to improve the living conditions of the household* (21% in the 2nd stage, 11% in the 3rd, 14% in the 4th, 11% in the 5th, 15% in the 6th, and 17% in the 7th stage). They were also built throughout the same period *to accommodate services and facilities* (6% in the 2nd stage, 13% in the 3rd, 6% in the 4th, 6% in the 5th, 12% in the 6th, and 17% in the 7th stage), *to provide shade* (4% in the 2nd stage, 4% in the 3rd, 15% in the 4th, 11% in the 5th, 18% in the 6th, and 6% in the 7th stage), and *to accommodate growing sons and/or daughters and other family members* during the 2nd (8%) and 3rd stage (7%).

Detached additions were built *to accommodate services and facilities* (8% in the 2nd stage, 4% in the 3rd, 5% in the 4th, 9% in the 6th, and 11% in the 7th stage), and to provide shade (4% in the 3rd stage). In a lower proportion, detached additions were also built *to generate extra income* (2% in the 2nd stage, 8% in the 3rd, 6% in the 4th, and 4% in the 5th stage) during the 2nd stage, *satisfy household's personal desires* (4% in the 5th stage).

Trailers and manufactured houses were brought into the lot after the first stage *to improve the living conditions of the household* (3% in the 2nd stage, and 6% in the 6th stage). It was a fast alternative to generate more living space to accommodate a rapid growth of the household such as a marrying son or daughter or a relative who moved in.

Dividing covered space was made to *improve the living conditions of the household* and flooring existing structures (6% in the 3rd stage, and 9% in the 6th). This was always done in covered shell space previously built as a logical step to differentiate activities, gain privacy, etc.

The frequency of the remaining relationships between the varied house form changes and different motivations had very low frequencies and were not considered very relevant.

7. CONCLUSIONS: PLANNING, DESIGN AND POLICY IMPLICATIONS

The following section presents the conclusions of this study organized according to the original research questions. These include the characteristics and patterns of house form and households in a sample group of colonias of Webb County, and the relationships between these two. The section discusses these conclusions and explores their implications for the environmental planning and design disciplines, as well as for policies addressing housing in colonias of Texas. The section closes with a description of the limitations of the research during the study. Recommendations for further research based on the questions that remained unanswered as well as new aspects observed during the research close this document.

7.1 Summary of the Research

This research identified the housing diversity and the process of housing consolidation in colonias of the US-Mexico border by looking at the patterns of house form and household arrangements in colonias of South Texas. The study selected ten colonias located to the east of the city of Laredo along Highway 359 on Webb County, Texas. The selection was based on characteristics of the colonias, availability of data, and access to the settlements. Data collected included periodic aerial images of the colonias selected spanning a period of 28 years, information from the 2000 census on these colonias disaggregated at the block level, and information from a field survey and a semi structured interview made to a random sample of 123 households between

February and June 2007. The survey instrument included information about the characteristics, structure and motivations of the households to build and improve their housing. The survey also incorporated information on how the house form was completed from the initial structure built or set on the lot until the present house form. Data was then compiled and analyzed using simple statistical methods complemented by descriptive accounts of the observations collected during the survey.

7.2 Conclusions and Interpretation

Looking for recognizable *house form characteristics and patterns of change* of the selected colonias (i.e., what happens first and what comes next in subsequent stages of development) the study confirmed that, like self-produced incremental housing in developing countries, housing in colonias is built in sequences of progressive stages managed by the household and over long periods of time. More specifically, this research showed that:

1 - Housing was built with identifiable patterns of successive changes to the houseform. In the selected colonias of this study, small permanent structures that are then enlarged with successive attached or detached additions, was the more frequent pattern followed. Prefabricated structures, such as trailers and manufactured housing, are also seen, although less frequently. Building temporary structures to be subsequently replaced is much less common. After building enough covered area to protect the household, house form changes such as dividing internal space into separate rooms, improving interior and exterior finishings, roofs, and exterior works such as pathways,

driveways and fences became more frequent. While the proportion of permanent structures does not differ relevantly with previous research in colonias, this study adds the perspective of how housing structures are built over time. The reasons to prefer permanent structures were not within the scope of this study, but they might be related with the possibility they offer to realize the households' long term aspirations for a more personalized house form. Permanent structures also adjust better to incremental construction by leaving more options (including size, materials, quality, etc.) to be determined by the household.

2 - The process of housing improvement goes on in identifiable stages and usually over extended periods of time. A small amount of complete housing was immediately built and about a quarter took between 1 and 5 years. Almost all the remaining two thirds took between 5 and 15 years or longer to complete. Almost fourth fifths of housing have taken anything between 3 and 6 stages to reach its current house form. The remaining cases were built in one of two stages or took more than seven stages. It is likely that this process of small and continuous investments in housing is the way for households to preserve the value of savings, but it also reflects the limits of their capacity to save for housing.

3- A large part of lots in colonias have remained un-built for a very long period of time. Unfortunately, these vacant lots contribute to the stereotype of colonias as underdeveloped areas of scattered housing making this land seem more rural, dispersed and disorganized that what it actually is. Moreover, the considerable proportion of uninhabited lots carries attached serious limitations to the servicing, environmental, and

economic sustainability of colonias. A large number of un-built lots prevent the creation of the economic base to support the provision of the required infrastructure to service colonias. The pattern of scattered uninhabited lots makes it difficult to reach inhabited lots with services in an efficient way. Too many empty lots also divert the attention of service entities to denser and more populated areas where the impact of services is higher. Some of the large size lots in colonias contribute to lower densities decreasing the capacity of colonias households to pay for the needed infrastructure. Additionally, uninhabited lots can keep households physically disperse making communication and organization in the community difficult and affecting the development of social capital.

4 - Despite the large amount of un-built lots, most of the land in colonias is residential and most lots have one differentiable main structure that houses one household (single, nuclear or extended). In that sense, most colonias households meet the current regulations that limit connection to services to single family households living in a single house. On the other hand, a smaller number are lots that have more than one main structure with a household living in each. Some of these are clearly divided into separate sub-lots. Even though regulations prohibit multiple households in colonias, this on-going process of densification of large lots in colonias could benefit colonias development. That is, the densification of under-populated colonias could contribute to create the base for the provision of infrastructure and services: more households would make the investment on infrastructure more efficient and affordable. Additionally, services would benefit a larger population. Subdividing large plots into smaller ones could only be problematic if the resulting sub-lots end up overbuilt, too

small or too narrow. The large lots that have been subdivided in the colonias studied are far from this problem, but possible negative consequences of this process could be managed or controlled by developing and enforcing land development regulations that observe the dynamics of this process.

5 - There is a modest amount of lots with forms of economic and productive activity in colonias. Some of them combine these activities with the residential function. This small economic activity can be interpreted as a positive sign for colonias because it brings certain level of autonomy to the residents and, even if small, indicates a development of a local economy of services. In developing countries, households in low income communities rely on these small earnings to create funds for urgent needs or to help going through hardships in case of job loss or illness. The economic activities within residential households observed in this study responded to similar rationales. In fact, it was surprising that the proportion of house forms including businesses or productive activities was not higher, since household incomes in Texas colonias are among the lowest of the state. The small size of these local activities and their impact on the local economy, however, may find an explanation in the relatively low densities of colonias. Thus, seeking ways to reduce the number of vacant lots and moderately increase density in colonias can benefit the development of local services.

Looking for recognizable *characteristics and patterns of households* living in these colonias (i.e., what are the characteristics of households in colonias and what kind of household arrangements can be found in colonias housing) this research concluded that:

1 - The average age of colonias' inhabitants has increased over the last years, but at a slower pace than inhabitants have grown older. This reflects an influx of new young households that find colonias an option for their housing needs and are coming to live in colonias. This is seen in the age of new household heads interviewed by this study. Almost all of them are sons and daughters of the original colonia inhabitants. This implies that colonias keep being an affordable alternative to new households seeking for homeownership.

2 - The average size of colonias' households has decreased even though some reached up to 10 members. This is largely due to the increasing number of single member households left after children have grown up and left the household. However, the influx of new households that was mentioned above can change this trend as new families move in and start having their own children. It is important to consider that colonias, as other residential areas, are subject to these demographic cycles that show declining populations that are eventually renewed with younger households. Hence the importance to base colonias policy over long term records rather than snapshots in time.

3 - Most of the household heads came from places within the state and many directly from the city of Laredo or even the same colonia. This may help to explain the few temporary structures built since households were already living in the area. About one in ten came from outside the state and one in five from Mexico. More than two thirds of the households are composed of the head, his or her partner, and sons and/or daughters. The other members of the household frequently seen are all members of the extended family. Even though the tenants that denied the interview was a small group,

no exact data was obtained on renters. This would confirm that most colonias are a pathway to homeownership.

4 - The initial motivation to build on the lot is to be able to move in or to signal the occupation of the land. The main reasons offered by households to extend and improve their house form in latter stages are, from most to less frequent, to improve the living conditions of the household, to accommodate services and facilities, to accommodate growing sons and/or daughters and other family members, and to provide shaded areas or to shade the house form. This explains why infrastructure is missing during the initial stages of housing development.

Looking at the dynamics between house form and household (i.e., how house household characteristics affect the development of the house form and vice-versa) this research concluded:

1 - No consistent relationship was established between relevant characteristics of the household and the house form. More specifically, the total covered area of the house form as well as the number of stages and total time used to complete its current form showed no significant relationship with the size of the household. However, there was relationship between these house form characteristics and the composition of the household. That is, extended families that included grandparents and great grandchildren lived in larger house forms than nuclear families without extended members. Single member households were the smallest house forms. But, large households with collateral relatives (nephews, brothers, sisters, uncles, aunts, etc.) did not always have large house forms. A possible interpretation of these findings is that households take responsibility

for direct-line relatives which is reflected in the accommodation of the house form to the particular needs of these household members. Collateral relatives are also found as part of colonias households in a short and long term bases. But the responsibility assumed by the main household does not involve major changes to the house form to accommodate these relatives and their individual needs. This implies that, the close relationship between household and house form expressed in the housing literature, as well as the motivations to improve and consolidate house form expressed by the interviewed households follow other priorities. Some possibilities are explored below.

2 - There was a strong association between certain house form changes and household preferences. After the first structure was built, attached structures were preferred more frequently to improve the living conditions of the household followed by accommodating services and facilities or providing shade and accommodating growing sons and/or daughters. Accommodating other family members was the less frequent preference. This reiterates the interpretation given to the lack of connection between house form characteristics and the presence of collateral relatives in the household. Detached additions were more frequently preferred to accommodate services and facilities, then to provide shade, and lastly to generate additional income to the household. Trailers were used mainly as initial structures and, less frequently in other stages, to improve the living conditions of the household. In later stages and after enough covered area for the household had been provided, preferences for dividing interior spaces into separate spaces and bedrooms and some aesthetic changes became more frequent. It is important to notice how specific house form types are associated to

certain moments in time as well as certain household types. This information could contribute to tailor the housing offer to target households according to their characteristics and the specific stage of house form development.

7.3 Policy Implications in Planning and Design

One of the objectives of the research was to incorporate the knowledge derived into the design and development of policies and strategies to improve housing, services, and infrastructure in colonias. Although the conclusions of this study are based on a limited sample of households interviewed in the colonias studied, it is desirable that consideration of these findings in the planning and management of these colonias would improve the development of colonias built environment and contribute to the quality of life of their residents.

To begin with, developing housing supply and support mechanisms that give consideration to the process observed in the colonias of this study would be worth considering. Conventional housing development, production and financing are far from competing with the mechanisms that are already operating in colonias based on individual practices of self-management construction and capital accumulation through housing. Stimulating construction in colonias should be a priority to generate sustainable and healthy built environments. Flexible standards, dynamic controls and regulations that give consideration to the process observed can be difficult to design and implement, but they are critical in promoting colonias consolidation. A more developed residential environment will increase the demand and the base for facilities and services. There is

room for improvement in the public and private participation in the housing process observed in colonias.

Regional and local legislatures have the possibility to enforce consolidation managing the variables that can stimulate the positive aspects of this process. For instance, whether idle residential land is owned by land speculators or by people without the interest or the capacity to build on it, the fact is that the high number of unoccupied lots prevents creating the base to support infrastructure. The state's prevention of sales of unserviced land has backfired preventing the overall development of colonias. Legislature has a main role unblocking this process. Plans for infrastructure and service improvement and even the sight of active housing consolidation have the potential to attract new residents who would in turn create the tax base to pay for infrastructure and contribute to the revalorization of property. Land revaluation would contribute to build up equity and stimulate higher construction standards.

Local governments and counties can also contribute to colonias development through policies, programs and projects that stimulate community involvement and individual participation. Policy to bring up infrastructure to standards, for instance, is a positive sign of development. But it would be even more effective if the community considers it a priority too. Policies that aim to improve and develop colonias ought to prioritize community needs in the same way that colonias households improve their housing. That is, community needs should be matched with the available resources and programs and projects and articulated in a successive, progressive manner. Public entities and institutions for colonia development, such as county development

departments, self-help centers, and community resource centers are central to develop this kind of partnership.

In addition to the important participation of households building their housing, private participation has opportunities to contribute to the development of colonias in the housing production, service delivery, and even financing of projects and programs.

The *manufactured housing industry*, for instance, has room to participate in colonias well beyond the second hand trailer market that is currently available to colonia inhabitants. The manufactured housing industry can learn from the characteristics of the incremental construction process observed in colonias to design and supply innovative housing systems that follow the patterns of the phased process observed in colonias. This research found out that housing is rarely built at once. Affordability in colonias relies on a close match between resources available and needs. Available economic resources play a part in this equation, but there are other factors equally relevant such as the lower cost of labor, the household's management of the process, the low cost of materials, etc. Designers and engineers of the manufacturing housing industry have a role proposing feasible alternatives to participate in this process. An open scheme of house parts that reflect some of the relevant stages identified by this study could be produced off-site and purchased when needed. Housing sections or pods that could be integrated to the existing house form by small crews of workers could have a high impact in the development of colonias. Innovation in design strategies of this type could find base in the work that began in the 1970s with Habraken's SAR in housing (1972) and has more

recently evolved into newer concepts adapted to contemporary problems (Habraken, J. 1998; Kendall, S. 2000).

The *private financial sector* could also contribute to colonias designing financial products and programs based in the type of small, short-term loans that characterize the incremental construction observed. The lower risk of smaller loans would be attractive to colonia inhabitants who could be more willing and able to meet short time financial commitments. NGOs and private development agencies -such as CDCs, would have more flexibility to implement this kind of financial programs than conventional financial entities and banks. Successful experiences on micro-financing from other countries, such as the Grameen Bank, could also serve as models for colonias (Yunus, 2007).

Joint *participation between private and public sectors* have also space in improving colonias housing. For instance, *small scale builders* have a relevant participation in the construction of housing in colonias. Training forces of small scale builders in meeting construction codes and regulations in improvements made in colonias housing could have a relevant impact in increasing construction standards. *Self-help centers* can organize and coordinate training programs for local construction workers around the importance of meeting construction regulations and safety codes. At the same time, alternatives to rigid standards could be explored combining the objectives of building codes and regulations with the accumulated experience of local builders.

Infrastructure and services is another possibility for joint private and public participation. There is an urging need to bring the level of services up to the needs of the majority of colonias households. This research showed that there is relatively small

number of lots with multiple households living in clustered main structures in large lots, or in sub-lots inside the original larger lot. These clusters and subdivisions reflect private arrangements between households that can not be legally registered or platted according to legislation and, hence, are banned from receiving public services. However, the majority of households in these colonias are composed of directly related family members who live in one structure set on one lot. And yet, with the exception of households in Larga Vista (who have water, sewer, electricity, garbage collection and paved roads) households of the remaining colonias lack paved roads, water and waste water disposal services (they have electricity and garbage collection). Legislation and service agencies should reconsider postponing the benefits of a majority based on the lack of compliance of a minority.

The *densification of colonias* from rural and semi-rural character to urban like environments is a process that is already on-going in modest but interesting ways at the individual level with the multiple occupation and subdivision of big lots. Understanding and managing the variables that can stimulate this process can contribute to a more sustainable built environment. Large lots and small ranches can help subsistence on a more rural lifestyle. Households can have crops and raise animals. As time passes, however, nearby urban areas expand their boundaries and distant colonias become suburban. The possibility of subdividing large lots at this time could contribute to create the base to support infrastructure and to create new housing opportunities for growing cities. This process would benefit the original households not only with the sales of part of their lots, but also with the provision of services. The excessive amount of large

vacant lots does not benefit this process. Legislature that prohibits the sale of unserviced empty lots is preventing the development of colonias infrastructure. Understanding the dynamics of the type of development occurring in colonias is key to design effective land policy. For instance, sales of vacant lots to individuals or groups committed to contribute to infrastructure development could be facilitated designing tax programs and strategies that made possible creating the funds to install service infrastructure.

- Promoting mixed use development can contribute to generate a beneficial level of autonomy from services elsewhere and a healthy local economy. There is already a small amount of lots with forms of economic and productive activities in colonias. Some of them combine these activities with the residential function. Developing a service economy, however, depends on creating demand for these services and supporting their development. Mixed residential and service activities contribute to eliminate the cost of renting or owning business space, contributes to lowering the cost of housing and generate activity and jobs within the community. Welding workshops, for instance, are an existing service in colonias commonly used to repair second hand trailers. Their activity has a double value because it contributes to the worker's household and to the residents who use the service. Local constructors are also a good example of a much needed service that could be promoted within colonias.

7.4 Lessons and Implications in the Housing Literature

Colonias are housing settlements in active development with poor infrastructure and services that are related with informal settlements in developing countries. Like in

developing countries, colonias housing attracts the urban poor because it is a competitive alternative to rental subsidized housing or city slums. Colonias also offer a path to home ownership and equity to the poor. This alternative is based on a match between housing and available resources, household's management of the housing production process, user-participation and self-help strategies, flexibility to prioritize and accommodate the households' changing characteristics and needs over time, and incremental construction and consolidation towards higher standards and better quality house forms.

However, the rationale of this process has no space within the set of conventions under which low-income housing is financed and produced in the US. Ironically, this is what makes colonias in the US an informal phenomenon and, because colonias house a relatively small amount of people compared to developing countries, it is likely to keep going on despite efforts made by legislature, planning and regulatory frameworks. Colonias show that there is potential for informal housing development to extend wherever public and private institutional housing frameworks do not attend the needs of the poorest, even the US. Understanding informal settlements should be a priority in a moment in which the weaknesses of global and local economies could have a serious impact in the living standards of the US.

The process of housing construction in the colonias observed in this research followed differentiable patterns of development in which house forms diversified and consolidated. That is, housing observed in colonias began with poor households building a range of primary house forms in middle to large lots that are improved over time to higher standards of space and services in incremental stages. Some lots accommodated

several related households either in clustered arrangements or in several subdivided sub-lots. Sharing land and services among several households was part of the equation making colonias affordable to the poor. Household size often increased by the addition of immediate and extended family members. Sometimes colonias housing also serves temporarily to newcomers arriving to the colonia before they begin their own search for housing in other lots and colonias. With time and more resources, housing improves in covered space, quality and appearance.

Perhaps the most valuable lesson on this study reaffirms the need to balance the lacks and deficiencies of colonias with the possibilities that colonias give to poor households. This goes back to the duality raised by John Turner between what housing is and what it does for people. The tangible benefits of colonias housing support this statement. The possibility given by incremental construction to accumulate, invest and preserve the value of household's assets may be operating better than conventional financial systems. The equity obtained in colonias housing may be higher than the material value of the resources invested in building the house because of the saves on materials, labor and standards. The overall result is that the house form has been completed in the most affordable way for the household.

But there are also less measurable benefits that housing provides to colonia inhabitants. The most evident for the household is the expression of pride and identity that households have in their housing. Land and home ownership provides reaffirmation and reassurance to the household. But even if the house does not have an exchangeable market value because of poor standards or because regulations prevent sales, the

satisfaction that households obtain by giving their sons and daughters a higher entry point in their housing ladder is probably equally important.

7.5 Limitations of the Study and Recommendations for Further Research

The study reported on house form and household characteristics of a specific number of colonias along Highway 359 in Webb County, Texas. The study also explored ways in which house form originated, diversified, and consolidated and households changed over time in these colonias. Consequently, the conclusions of this report apply only to the specific colonias studied and should not be used to explain other colonias without careful consideration of the set of contextual conditions surrounding them. However, the findings of this study can contribute to design and implement strategies directed to improve the quality and level of services, urban development, and quality of housing on these and similar colonias.

One of the important limitations of this study was to confirm the link between household characteristics and house form. This is a relationship that the literature on incremental low-income housing identified as a driving force of the housing process. Even though the study showed that households established connections between their specific needs and characteristics and the changes they made in their house forms, these relationships were at best inconsistent, but some in fact showed no relevance. More specifically, household and house form characteristics showed no relevant correlation except for a limited connection between household type and the characteristics of the house form (size, stages and time to be built). Although the choice of the sample and sample size, as well as the household and house form characteristics used in the research

may have influenced this result, it is possible that more relevant factors relating household and house form were not considered by this research. One of the ideas that came during the writing of this document was the relationship of available resources and house form change. Thus, the availability of resources, particularly economical resources, could be a better predictor of changes on the house form. Since housing represents the biggest investment for low-income households it is also their major savings form. Consequently, house form would be a better indicator of household wealth rather than of household characteristics or needs. Although in our study this could explain why a few of the largest and more consolidated house forms were owned by small households, there is a need to investigate this connection with more detail.

Some of the issues that were touched upon and discovered during this study deserve more attention and would benefit from further research. The most relevant ones close this document.

The study had limitations in collecting data about household characteristics over time. Relationships between house form and household size over time depended exclusively on the reports provided by households about their motivations to improve their housing. Attempts to validate this relationship correlating house form and household size showed no significance. It is reasonable to assume that no one is better situated than the household to know who lived in their household and for how long. However, there may be several reasons that explain this inconsistency. For instance, it is likely that households remembered well the people who lived permanently in the household but did not remember or omitted people who lived temporarily with them even if for several years. A larger sample comparing household and house form size

could contribute to clarify this issue. However, beyond finding ways to validate this specific relationship, the point made here is the need to look for alternative strategies to overcome the limitations of informants to remember or provide accurate information. This is an important element to consider in future research.

This research focused on residents who owned their lots in colonias. This was a result of the fact that lot renters rejected being interviewed. Thus, the issue of how much renters affected their house form (especially since it did not belong to them) or how much they actually knew about how their house structures were generated remains unanswered. Observations of signs offering lots for rent during the survey raised the question of how renters lived in colonias. It is even possible that renters that had lived within the surveyed households were not reported because they were not considered part of the permanent households or, because of the precautions taken by households to reveal information about unrelated members. The 2000 census reported that colonias proportion of tenants (18.19%) was lower than Webb County's (34.33%). This research showed a small number of renters in the sample who rejected the interview (7 households - 6%). Studying the characteristics of tenants in colonias and the possible relationships between tenants and house form could contribute to understand colonias more profoundly. Tenants in colonias may occupy the lower ranks on the colonias' household ladder. Knowing the characteristics of tenants in colonias would be relevant to have a better understanding of the diversity of colonias housing and the needs of this group of households.

The cost and management of services individually assumed by households is another issue to look at in more detail on colonias. With the exception of Larga Vista,

each of the households of this study individually manages their needs for water supply and wastewater disposal. Having water in the household implies acquiring or building water storage tanks and systems to pump water into bathrooms and kitchens. It also involves having a portable water container (usually a trailer or a pickup truck with a water tank attached) to haul water from the water distribution points to the household, and the time to do this several times a week or paying somebody to do it. Disposing of used water involves building and maintaining septic tanks or digging latrines and building outhouses. Studying the mechanisms that are involved and the resources that are invested in the process of water supply and water waste disposal is important for colonias. This type of research could help determine the economic base to support the provision of needed services to colonias from either public or private sources.

Finally, the use of aerial images of the colonias over several years since their creation helped to broaden the view of this research from the selected sample of households, to the extent of the colonias studied. They were very useful to identify general house form characteristics and to foresee what could be found to prepare for fieldwork. These images, however, can not provide the information collected during fieldwork directly from households. But, images could serve to connect findings back with the aerial data. This could be tested out experimentally by identifying a larger sample in the aerials based on house form similarities and verifying the assumptions in the field. Developing mechanisms that can increase the scope of study of colonias would contribute to generate the much needed knowledge about the characteristics of these settlements and their communities.

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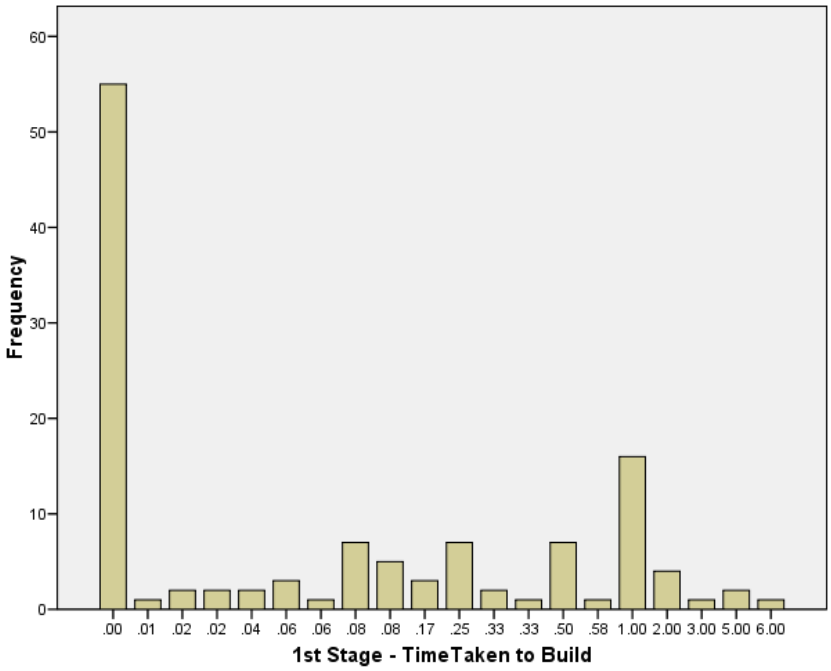
APPENDIX A

ADDITIONAL IMAGES



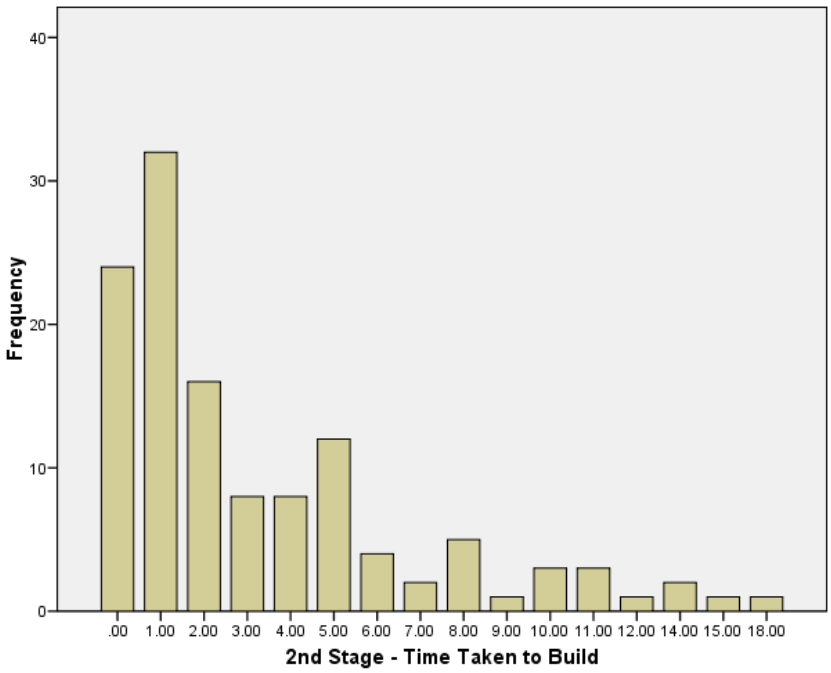
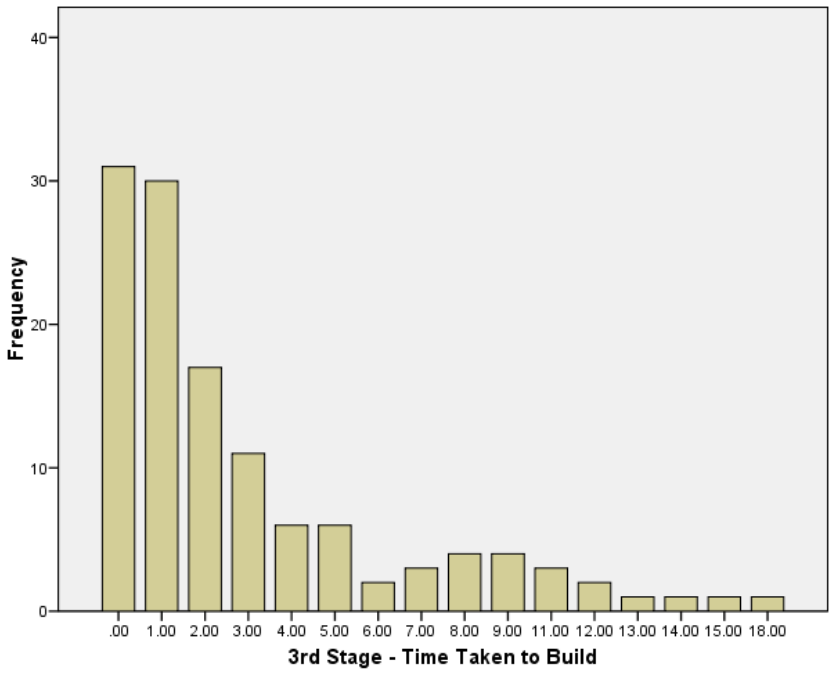


Fig A1. Time taken to complete each stage in years (1^{st} – 2^{nd} stage)



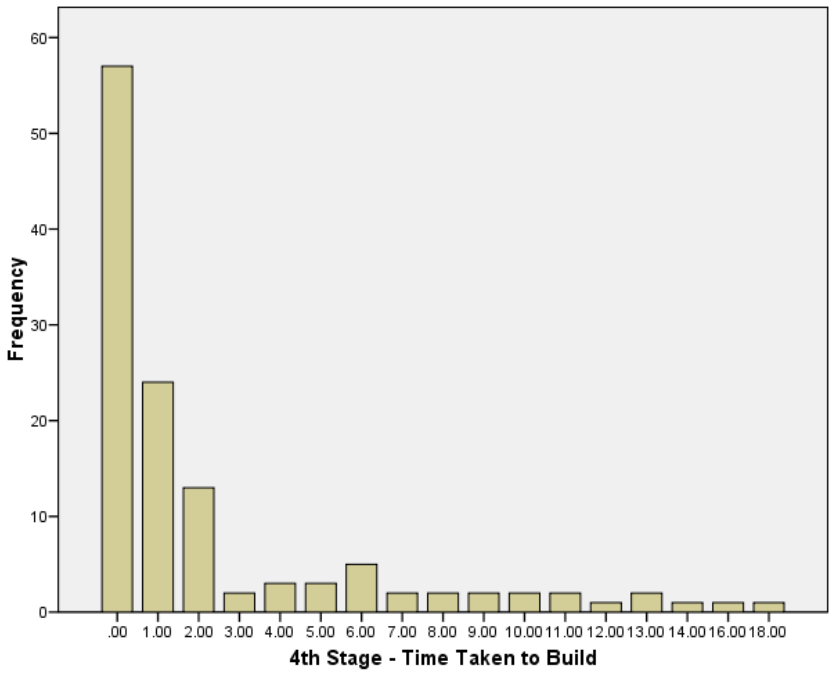


Fig A2. Time taken to complete each stage in years (3rd - 4th stage)

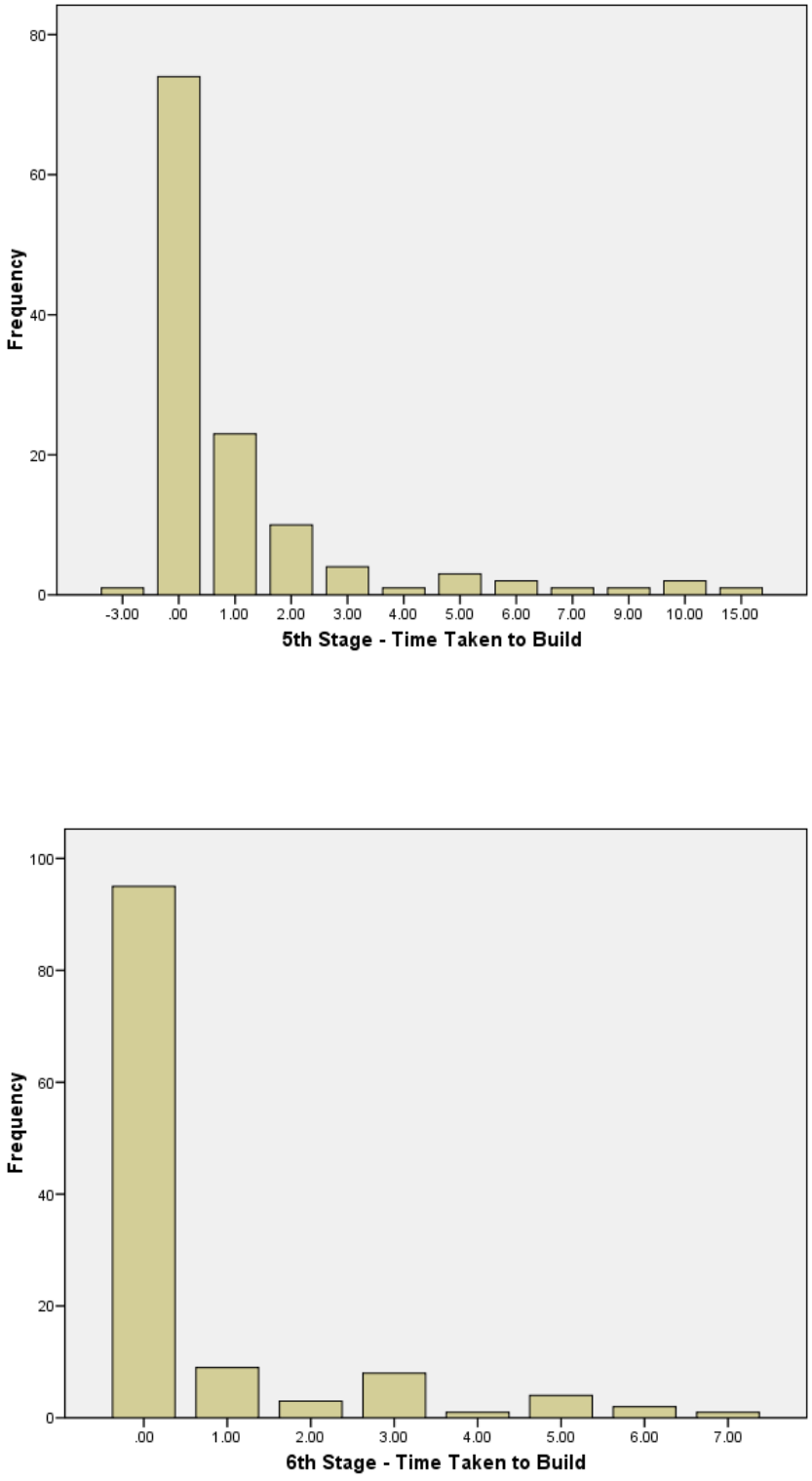


Fig A3. Time taken to complete each stage in years (5^{th} to 6^{th} stage)

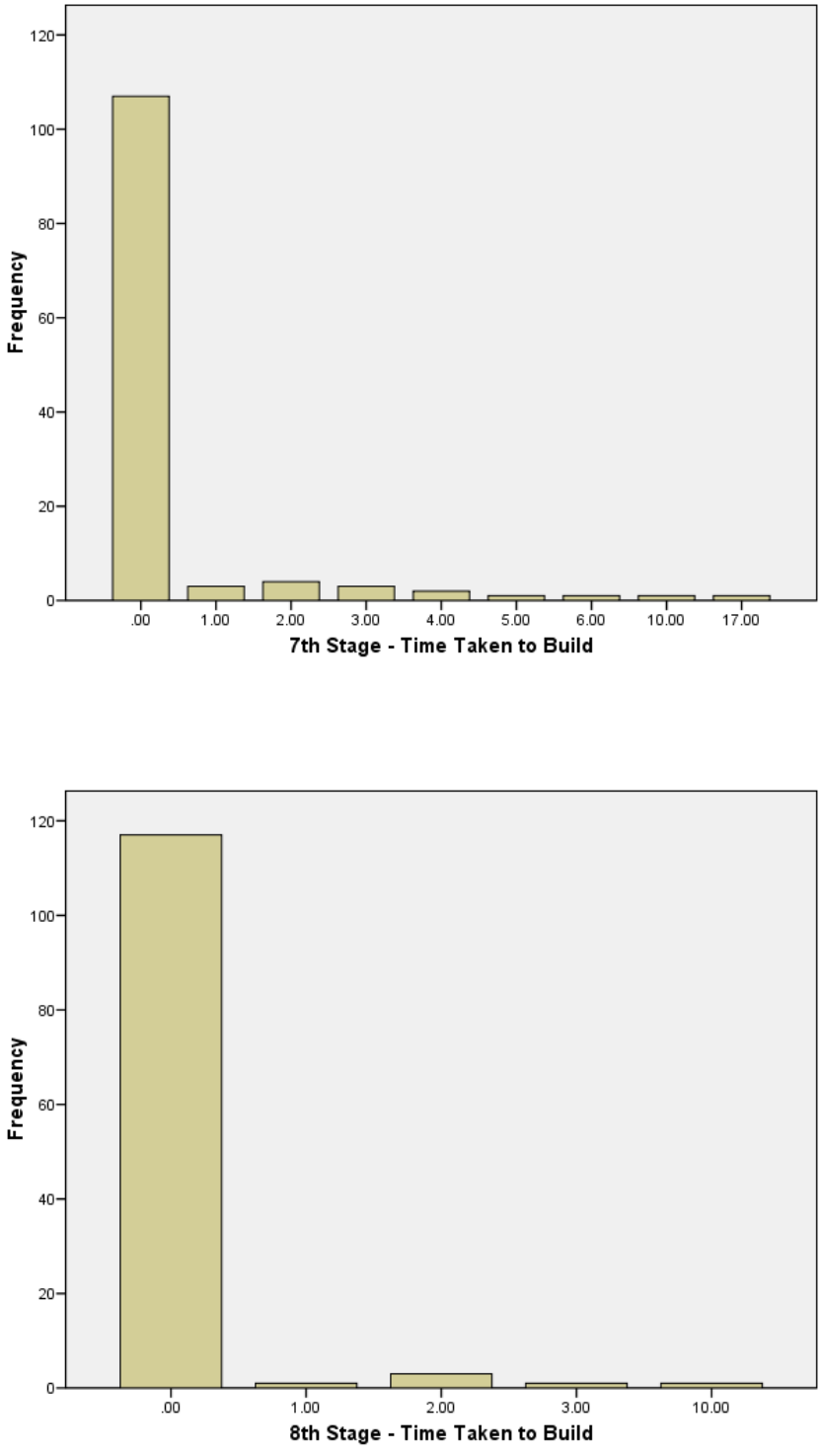
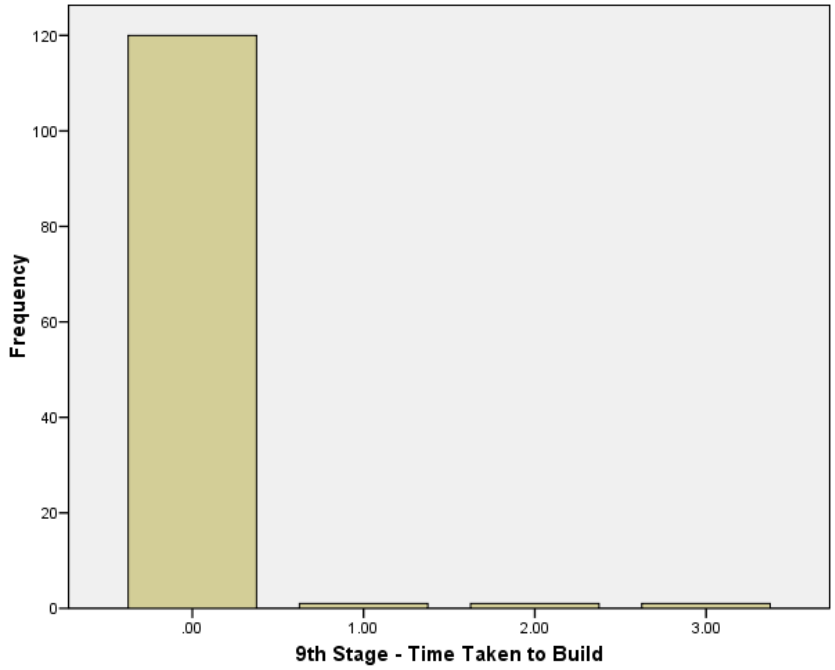


Fig A4. Time taken to complete each stage in years (7^{th} to 8^{th} stage)



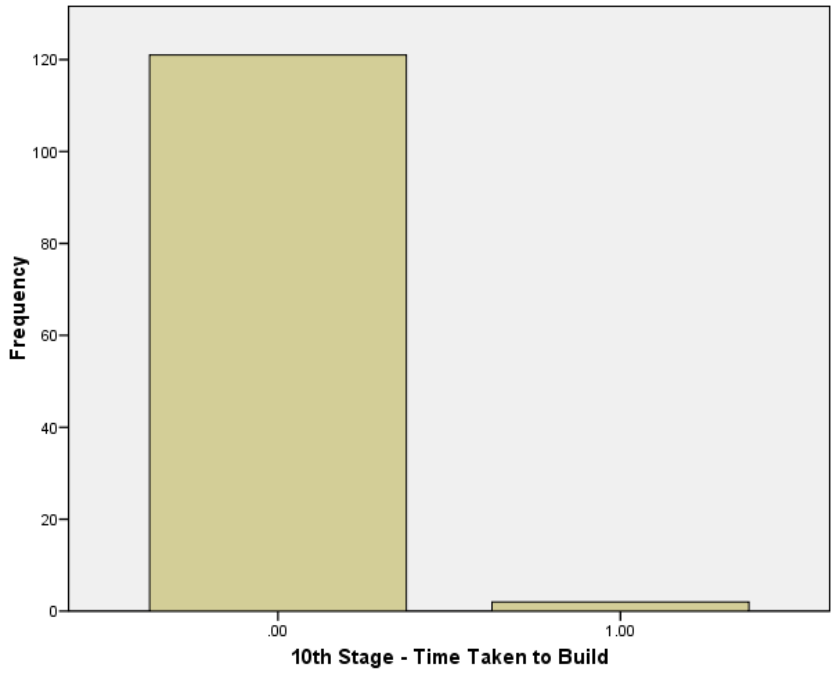
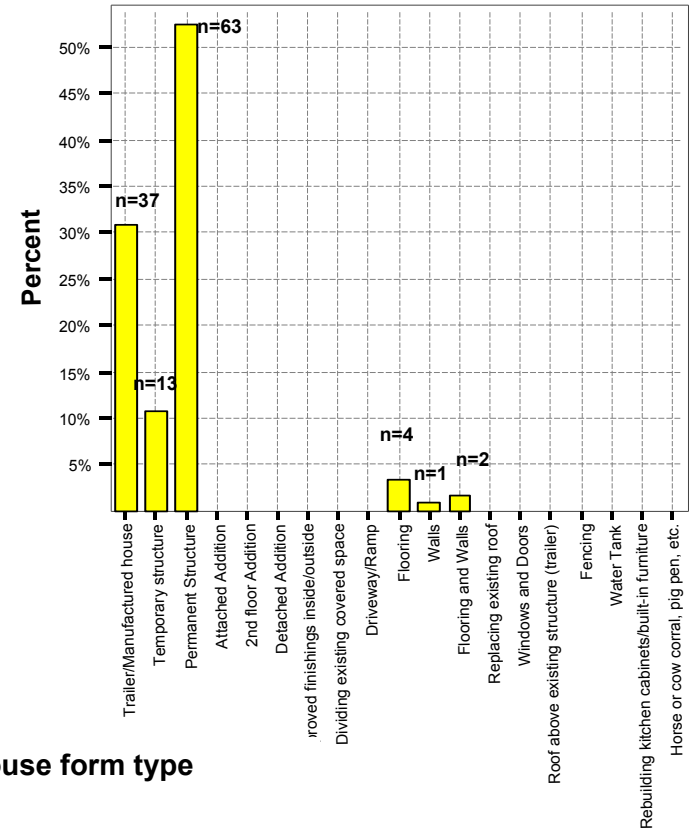
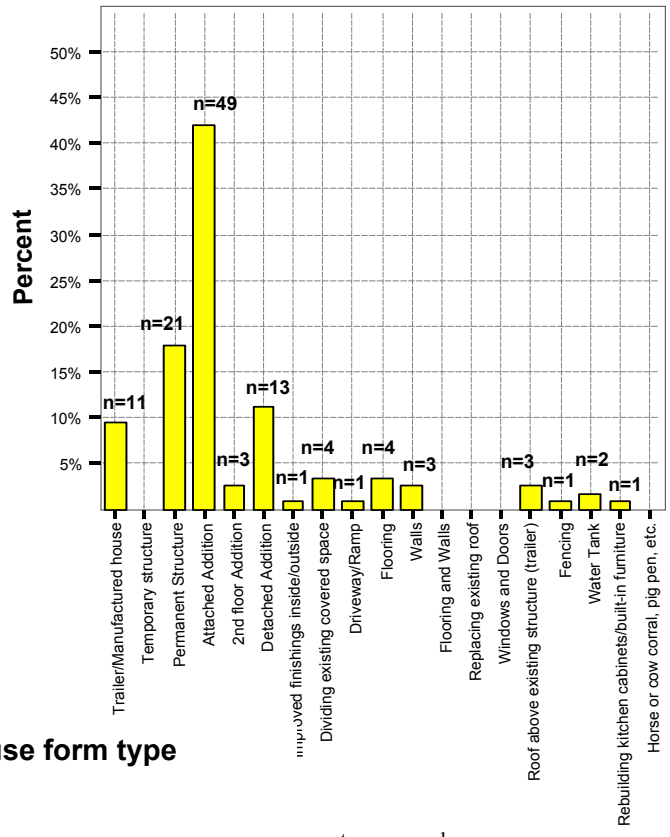


Fig A5. Time taken to complete each stage (9^{th} to 10^{th} stage)

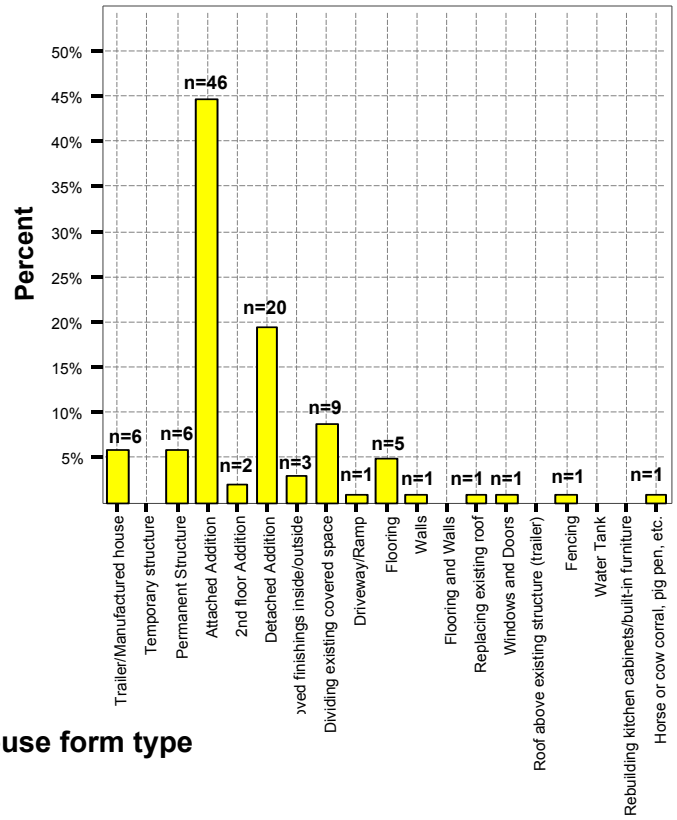


1st, stage house form type

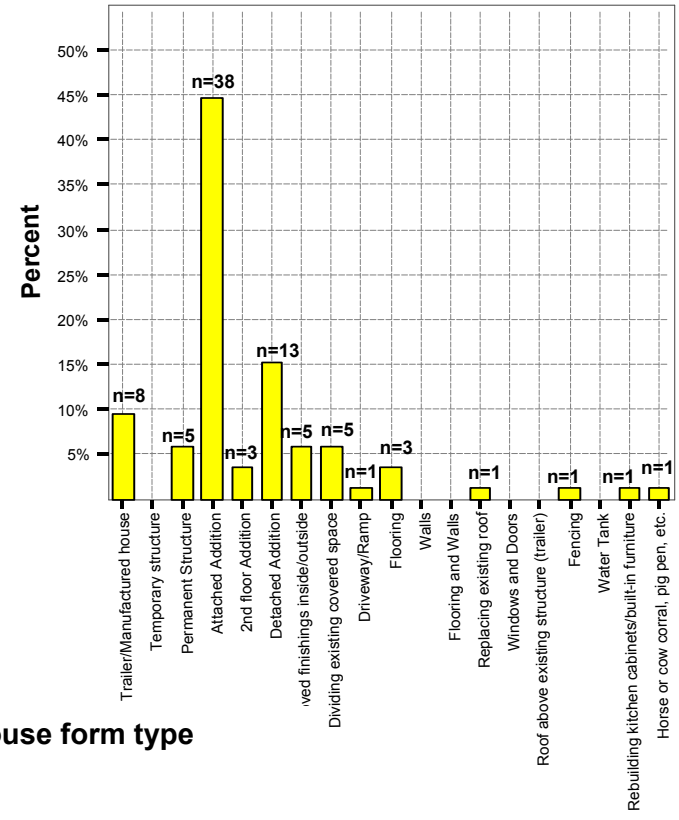


2nd, stage house form type

Fig A6. House form changes per stage (1st and 2nd, stage)

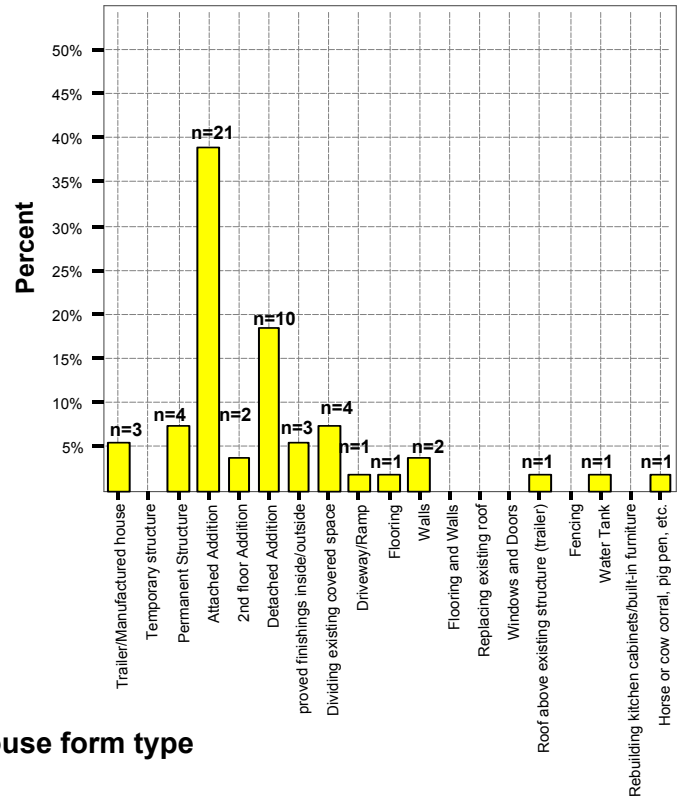


3rd Stage house form type

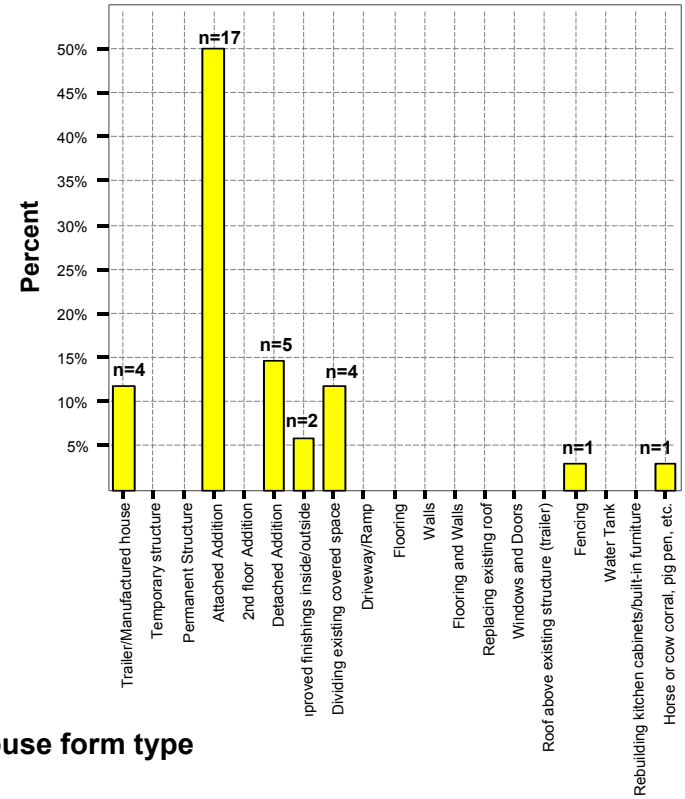


4th Stage house form type

Fig A7. House form changes per stage (3rd and 4th stage)

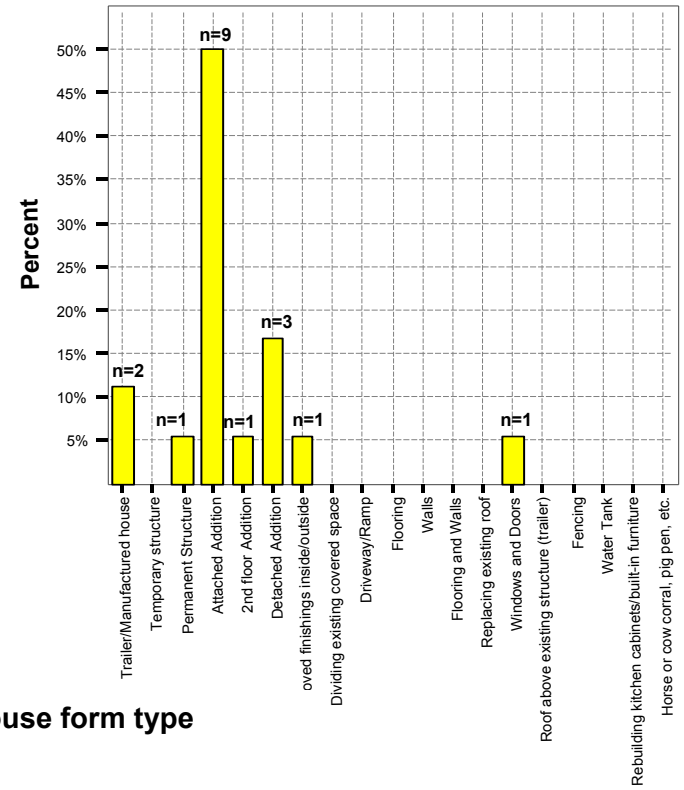


5th, stage house form type

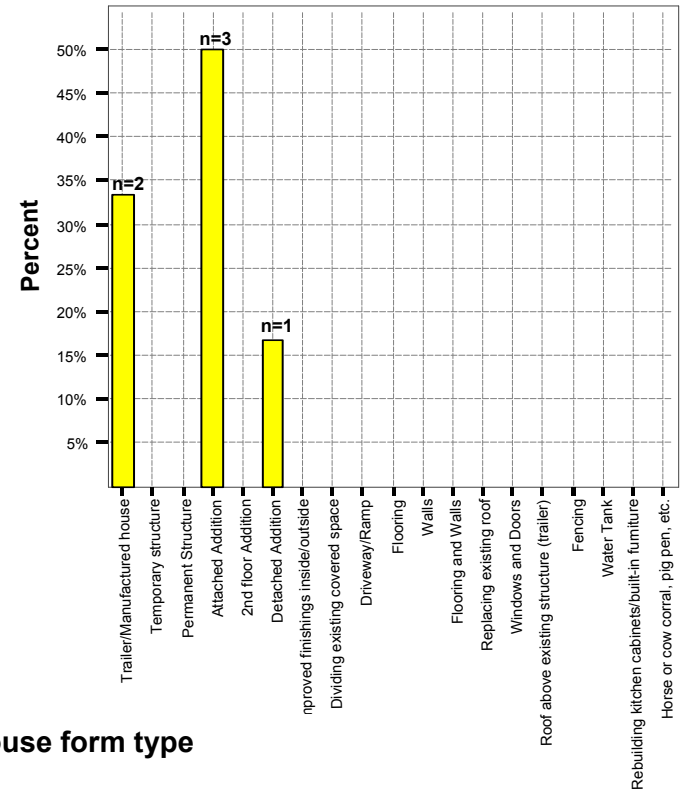


6th stage house form type

Fig A8. House form changes per stage (5th and 6th stage)

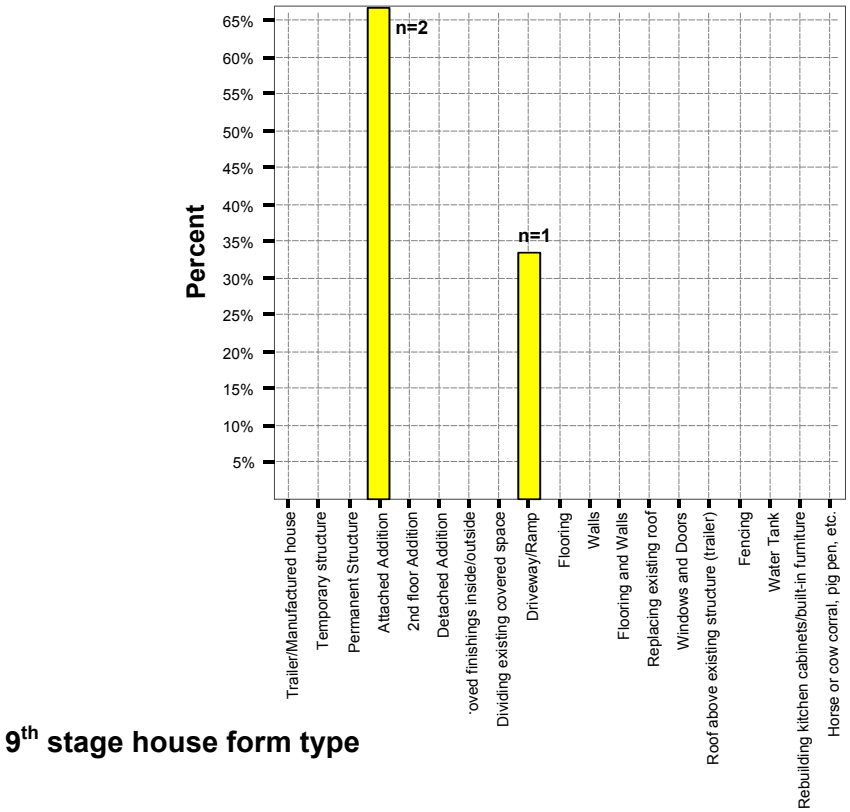


7th stage house form type

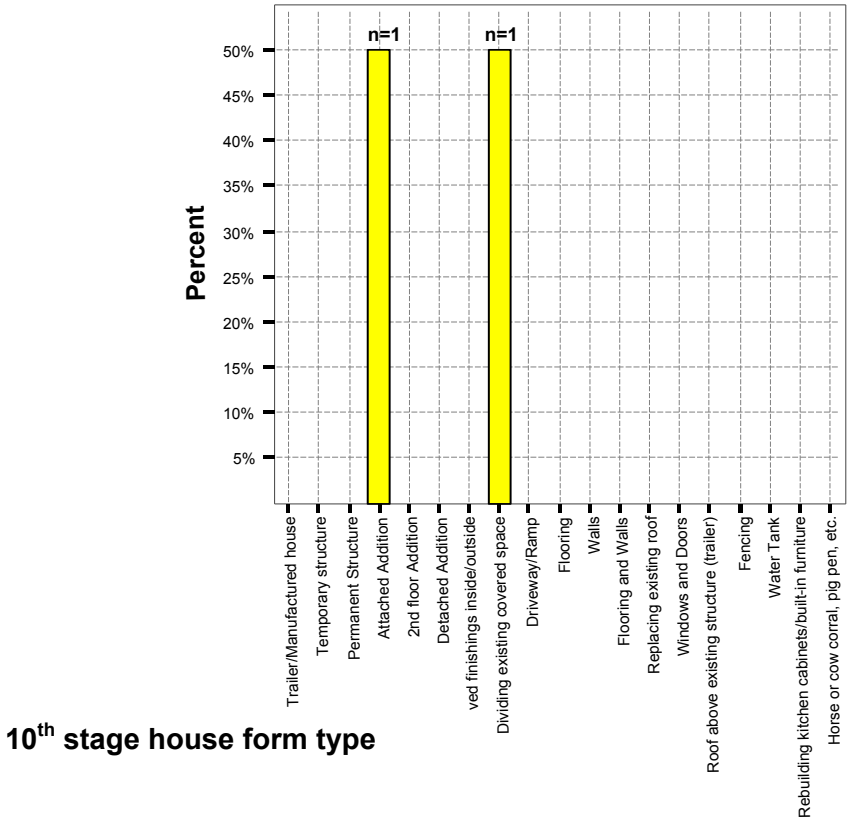


8th stage house form type

Fig A9. House form changes per stage (7th and 8th stage)



9th stage house form type



10th stage house form type

Fig A10. House form changes per stage (9th and 10th stage)

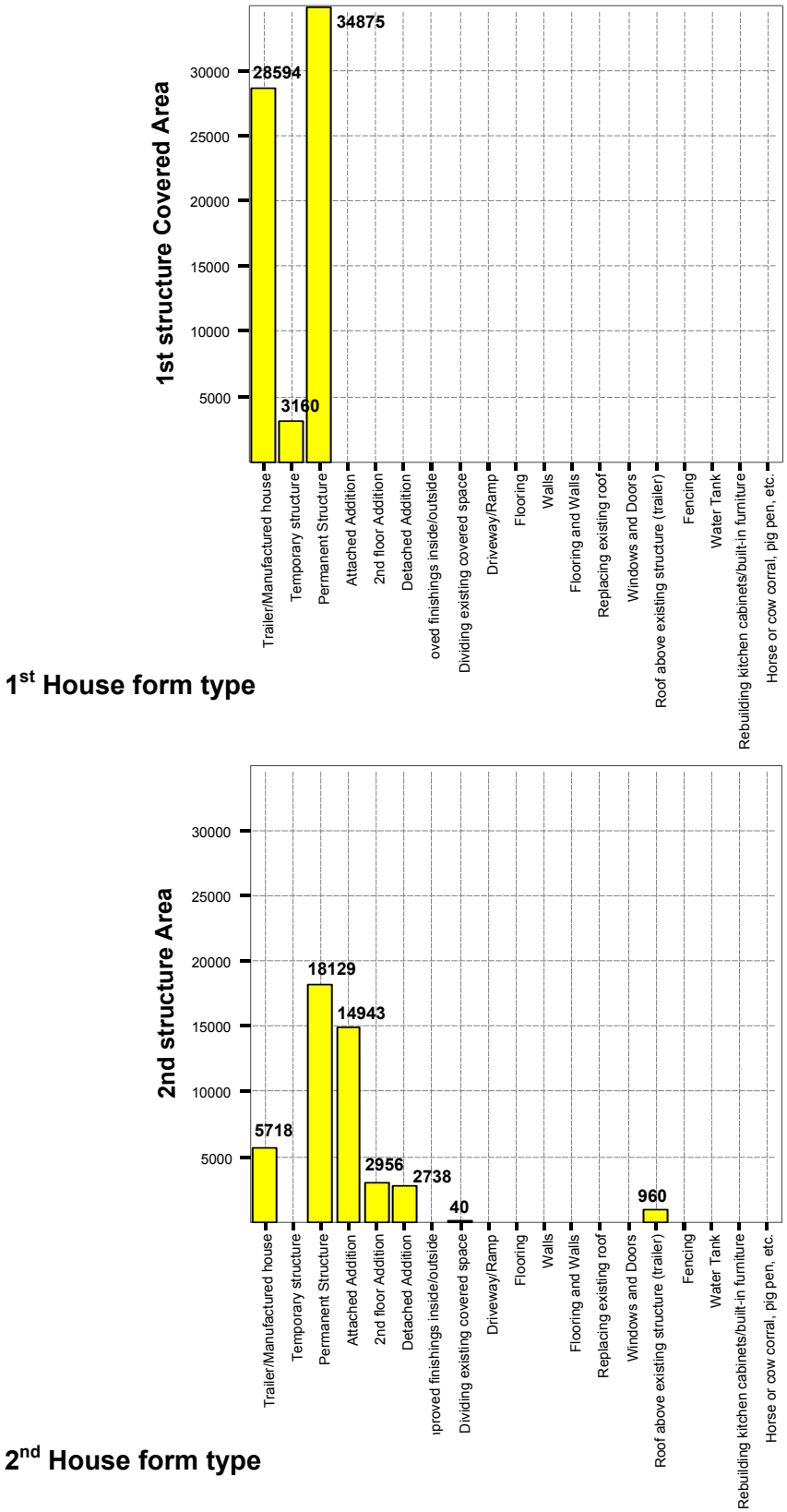
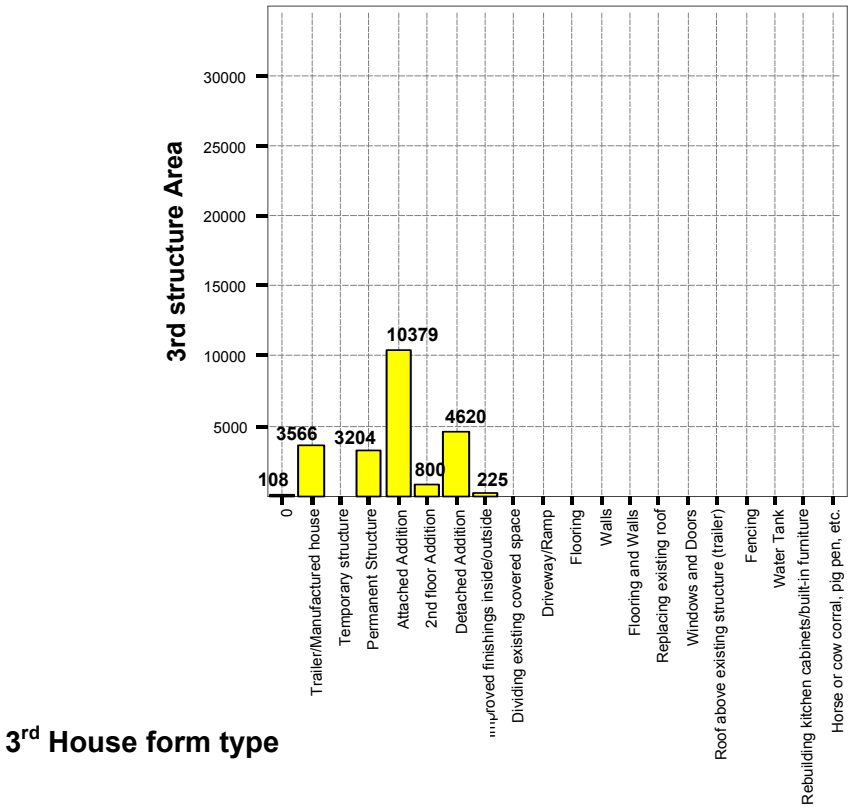


Fig A11. House form built up area per stage (1st and 2nd stage)



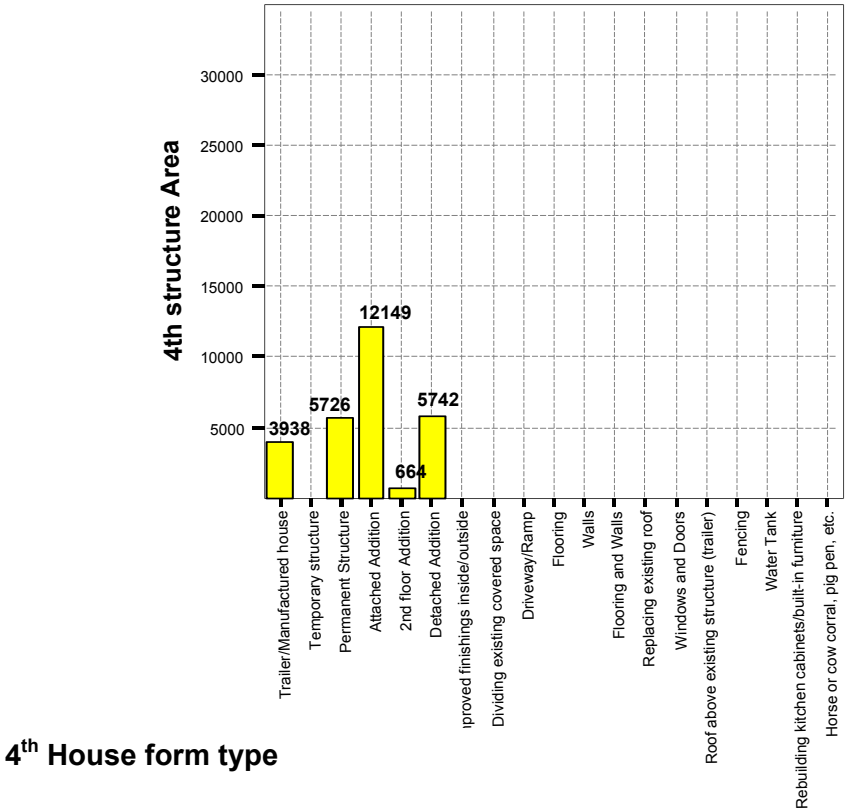
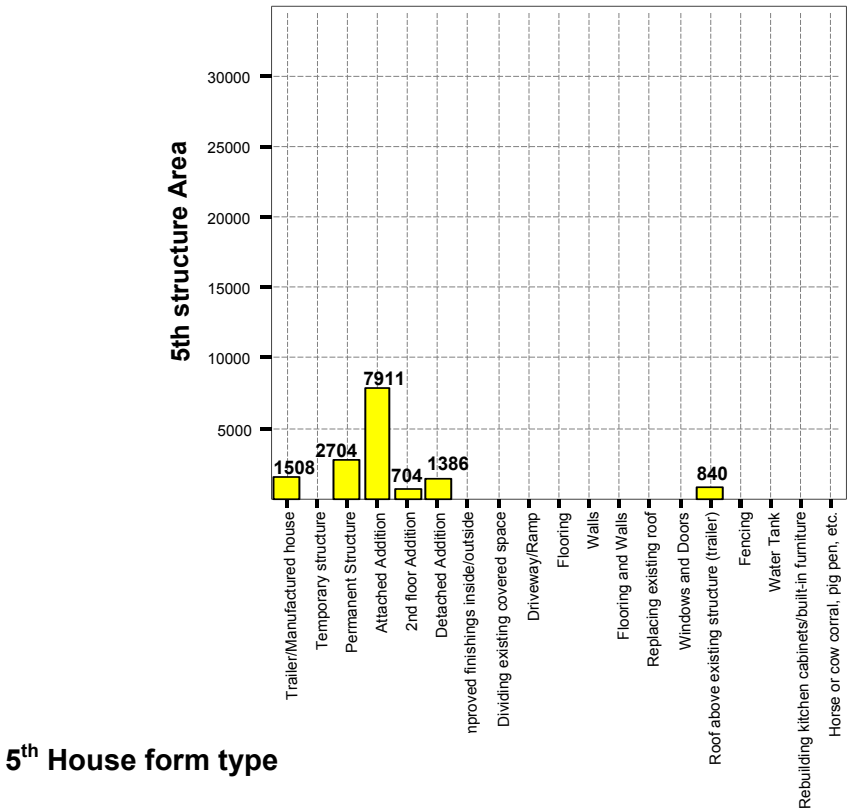


Fig A12. House form built up area per stage (3rd and 4th stage)



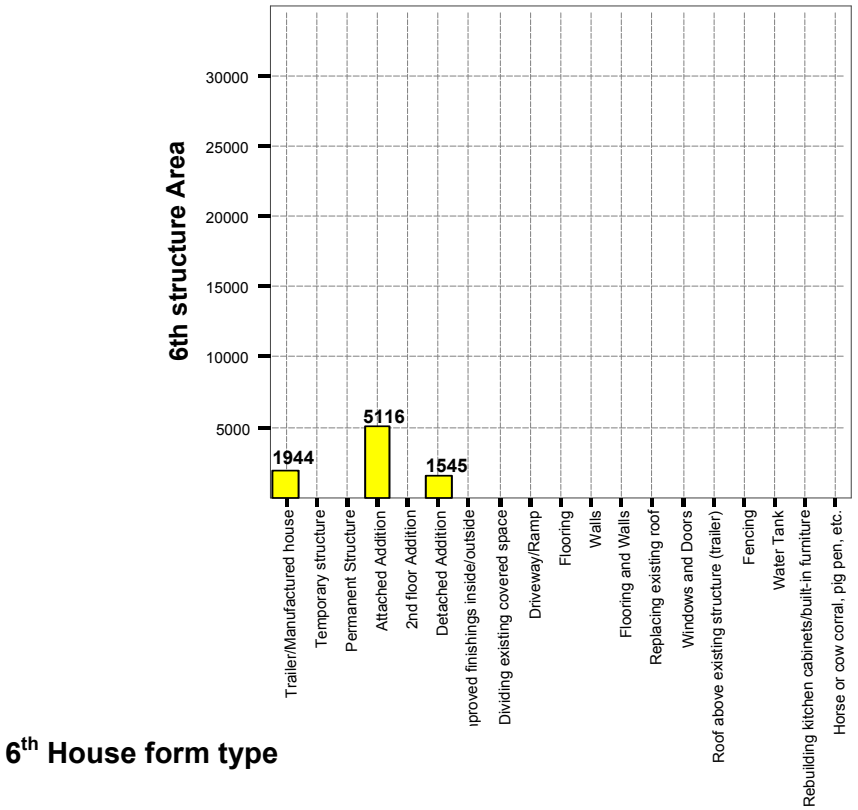


Fig A13. House form built up area per stage (5th, and 6th stage)

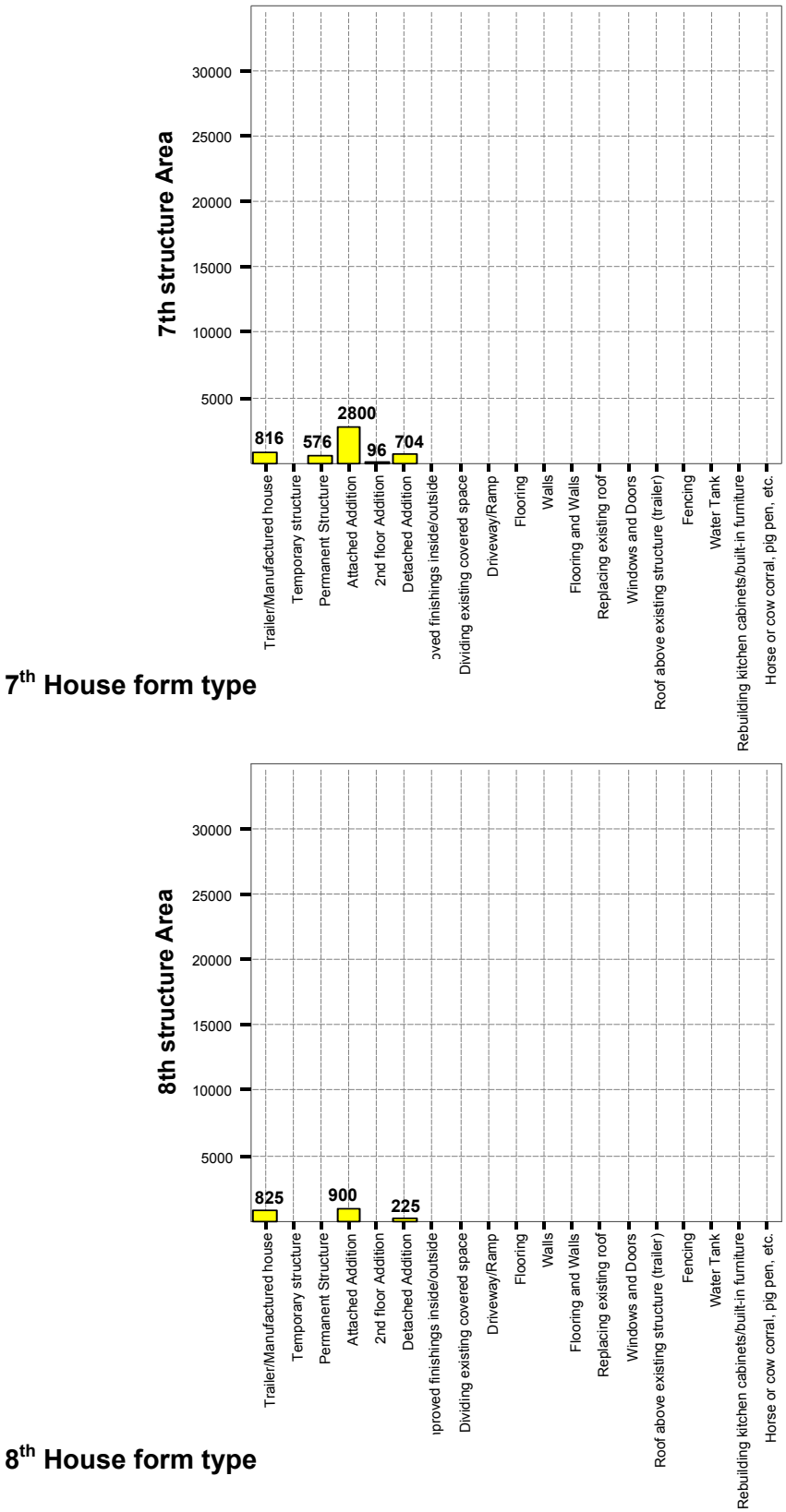
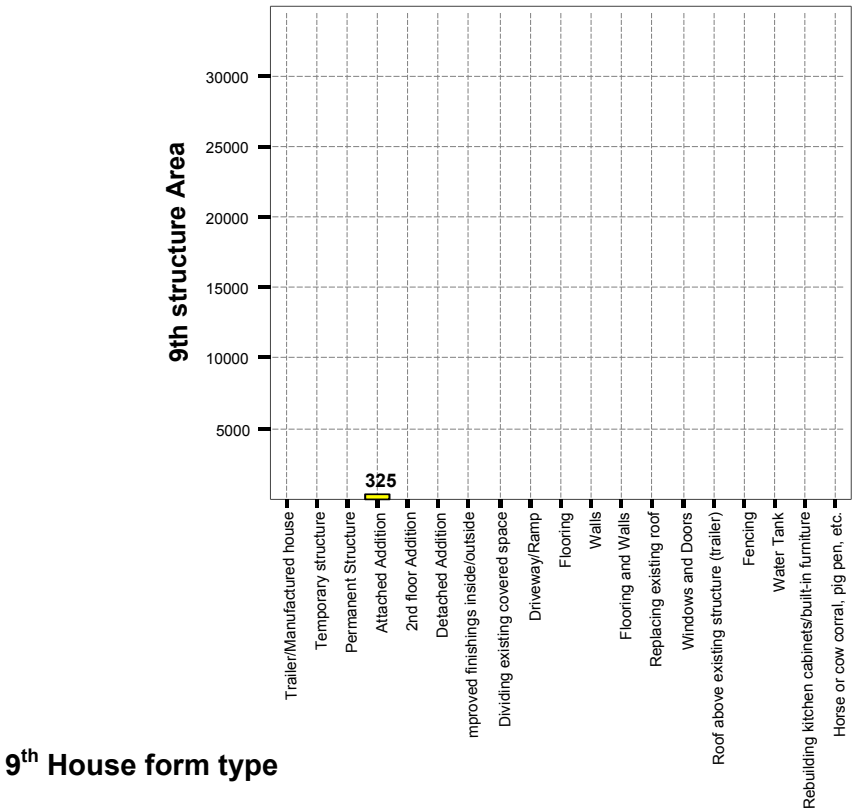


Fig A14. House form built up area per stage (7th and 8th stage)



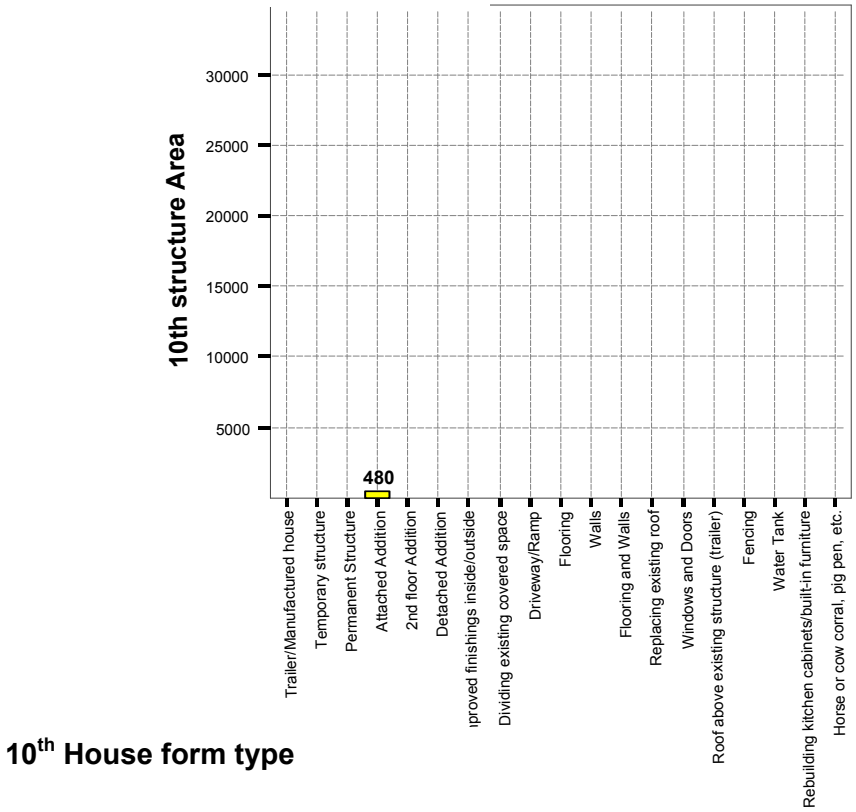


Fig A15. House form built up area per stage (9th and 10th stage)

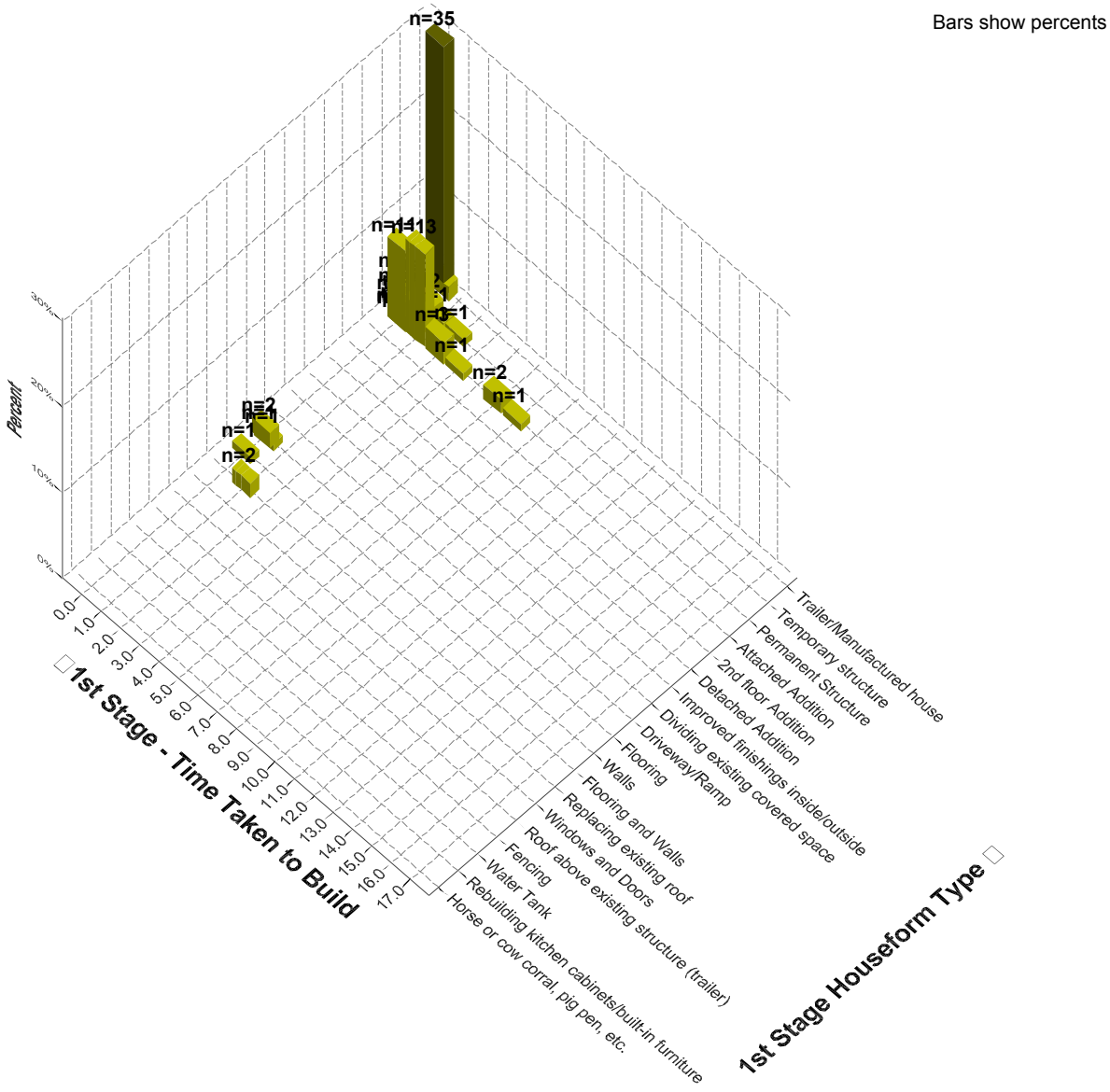


Fig A16. House form change vs. Time to build (1st stage)

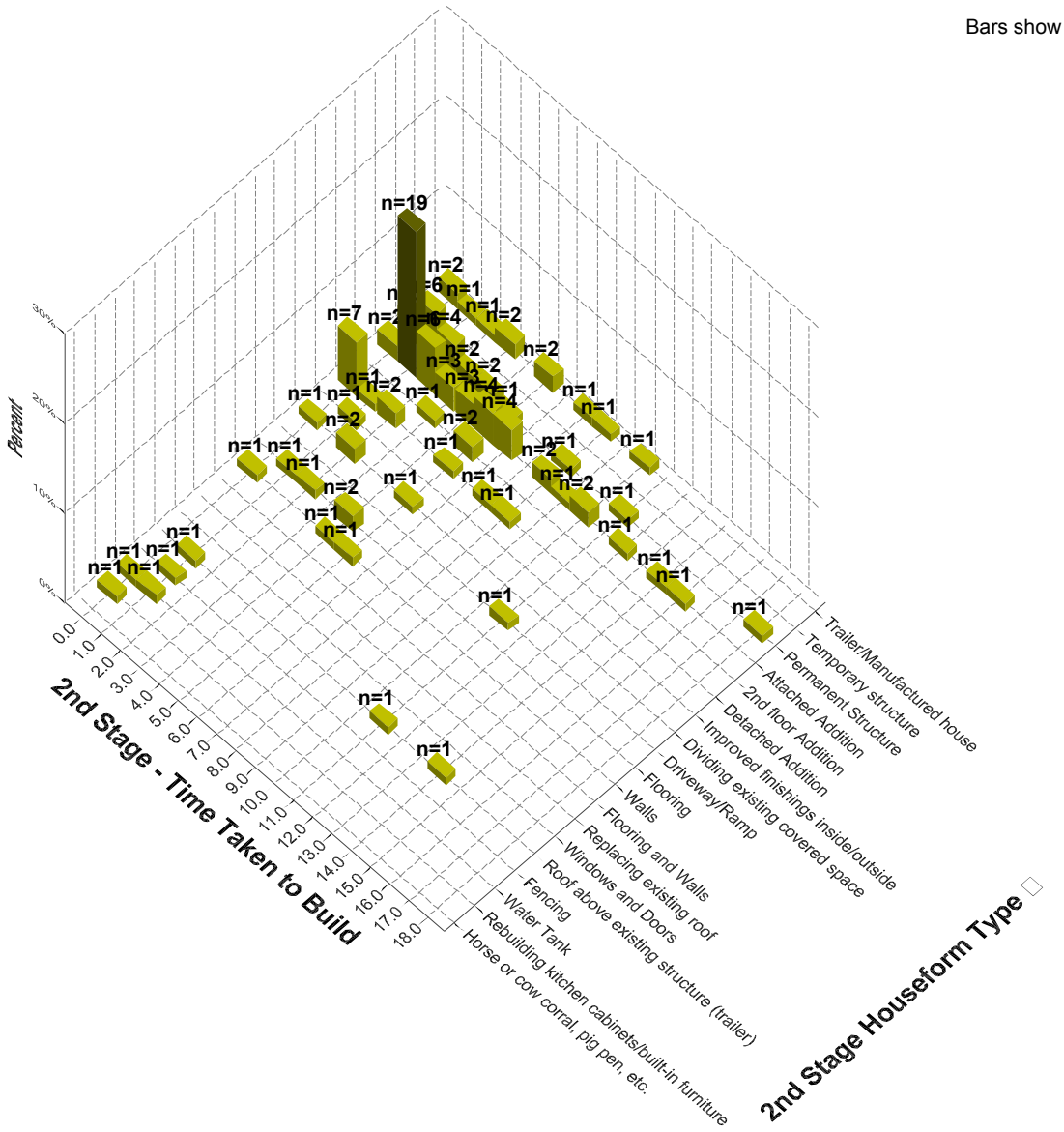


Fig A17. House form change vs. Time to build (2nd stage)

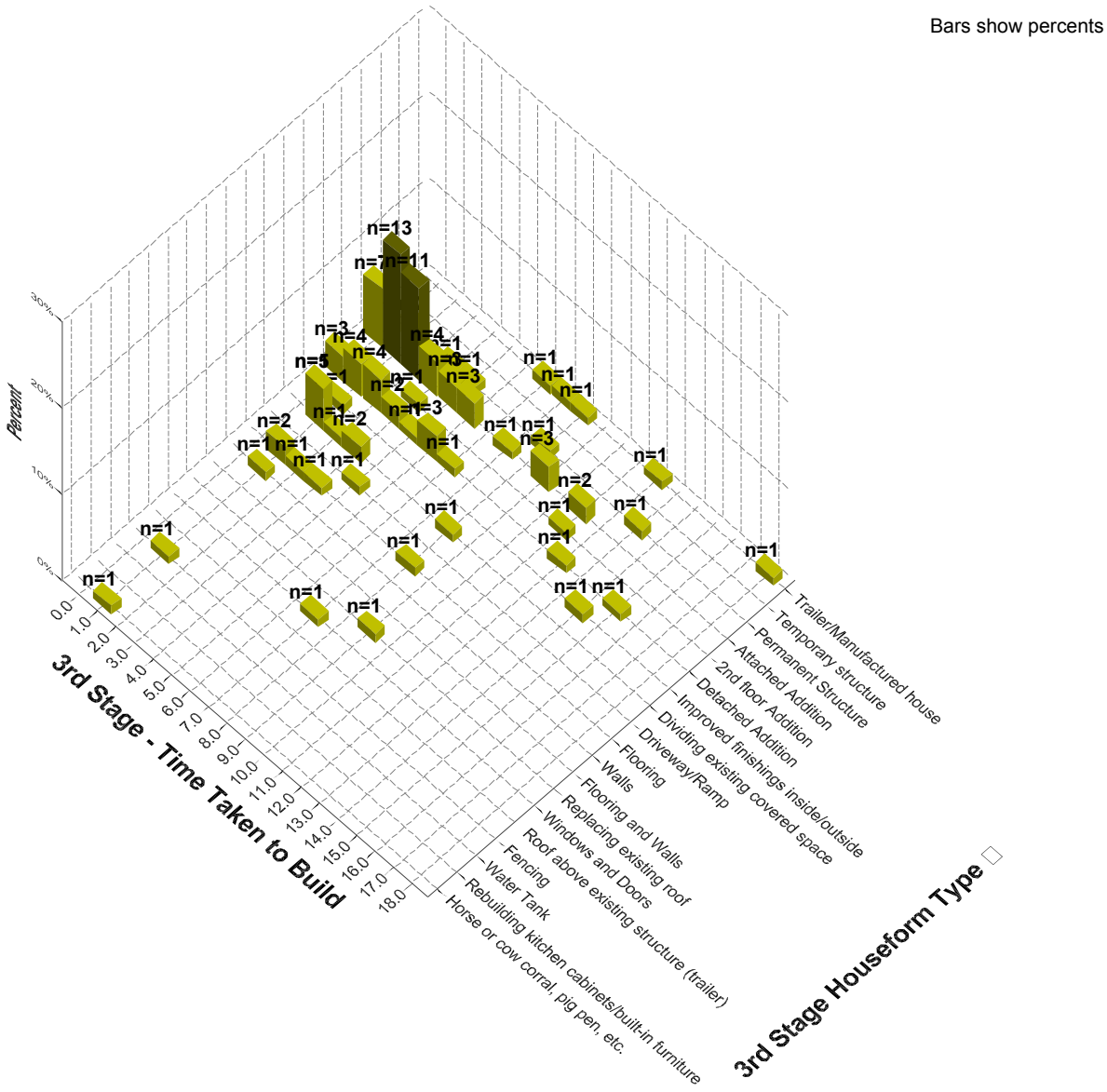


Fig A18. House form change vs. Time to build (3rd stage)

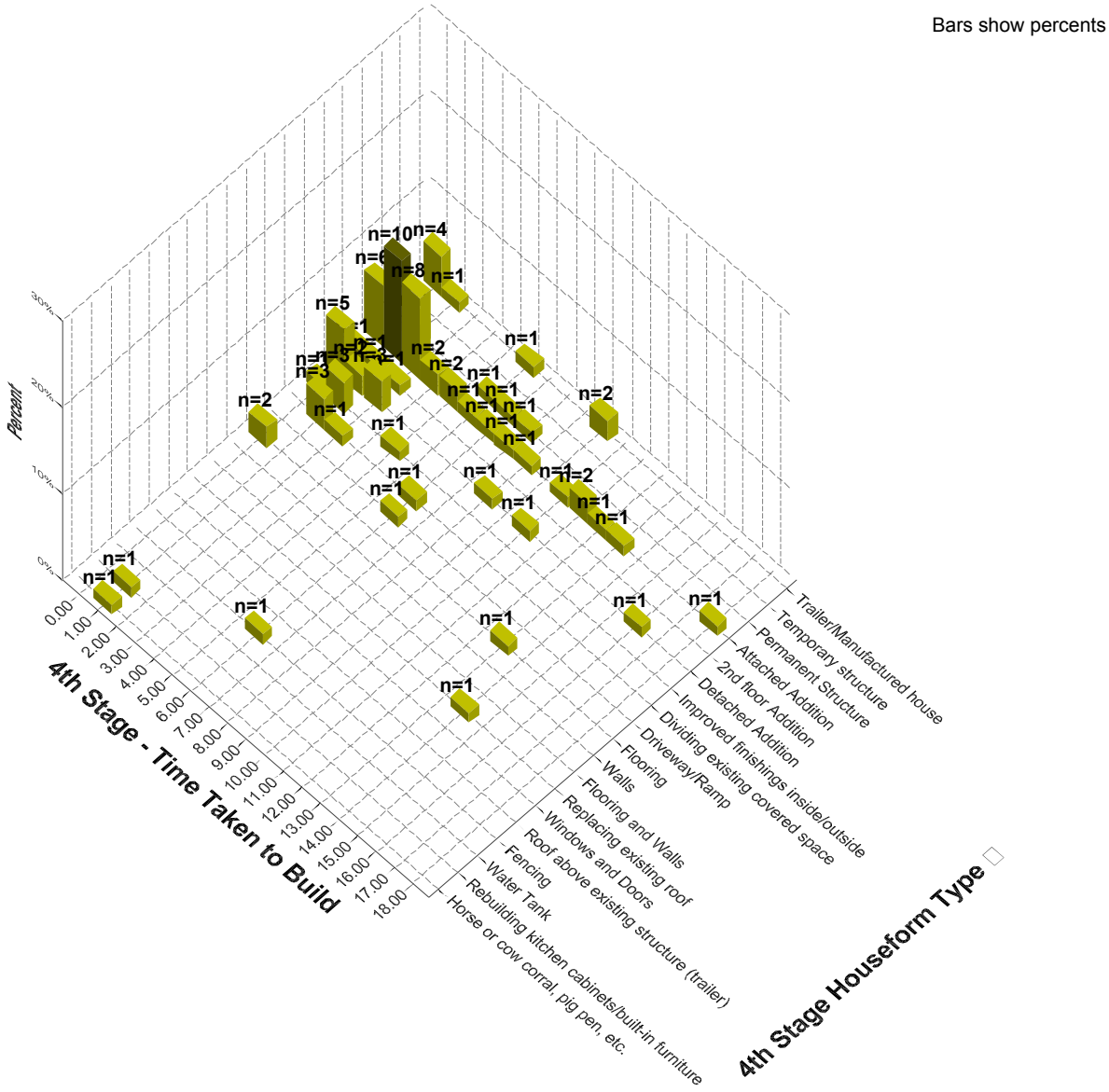


Fig A19. House form change vs. Time to build (4th stage)

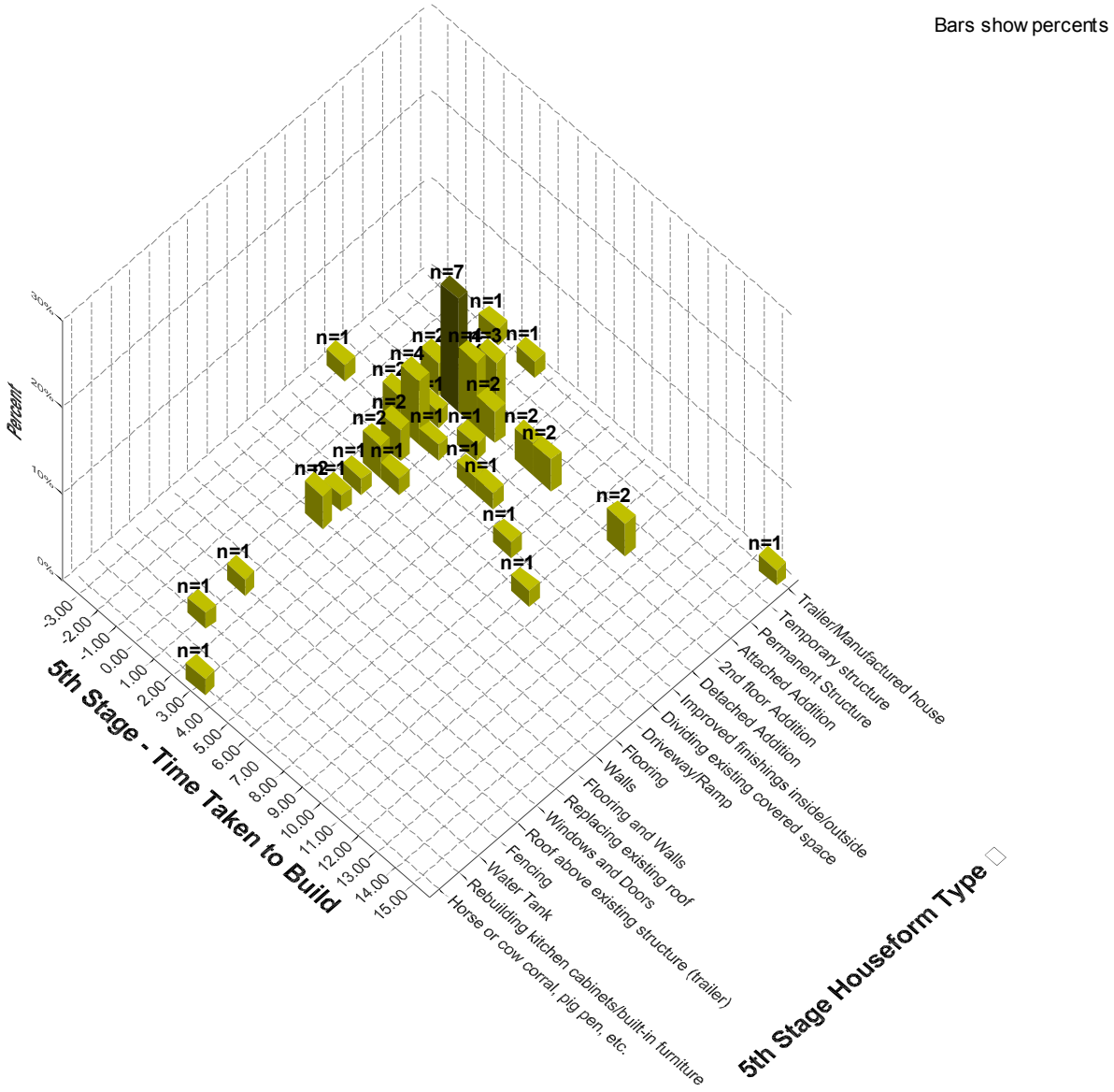


Fig A20. House form change vs. Time to build (5th stage)

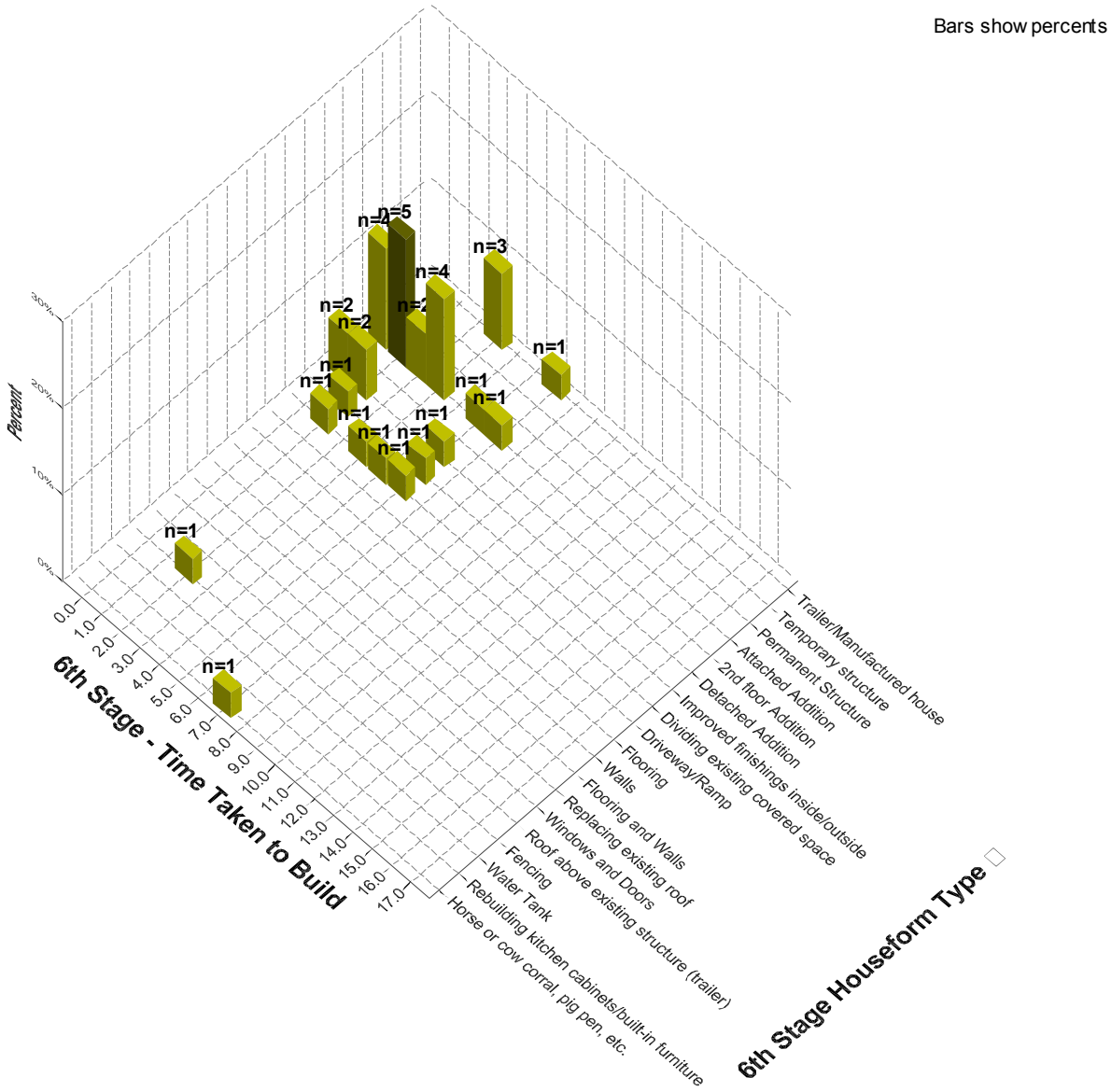


Fig A21. House form change vs. Time to build (6th stage)

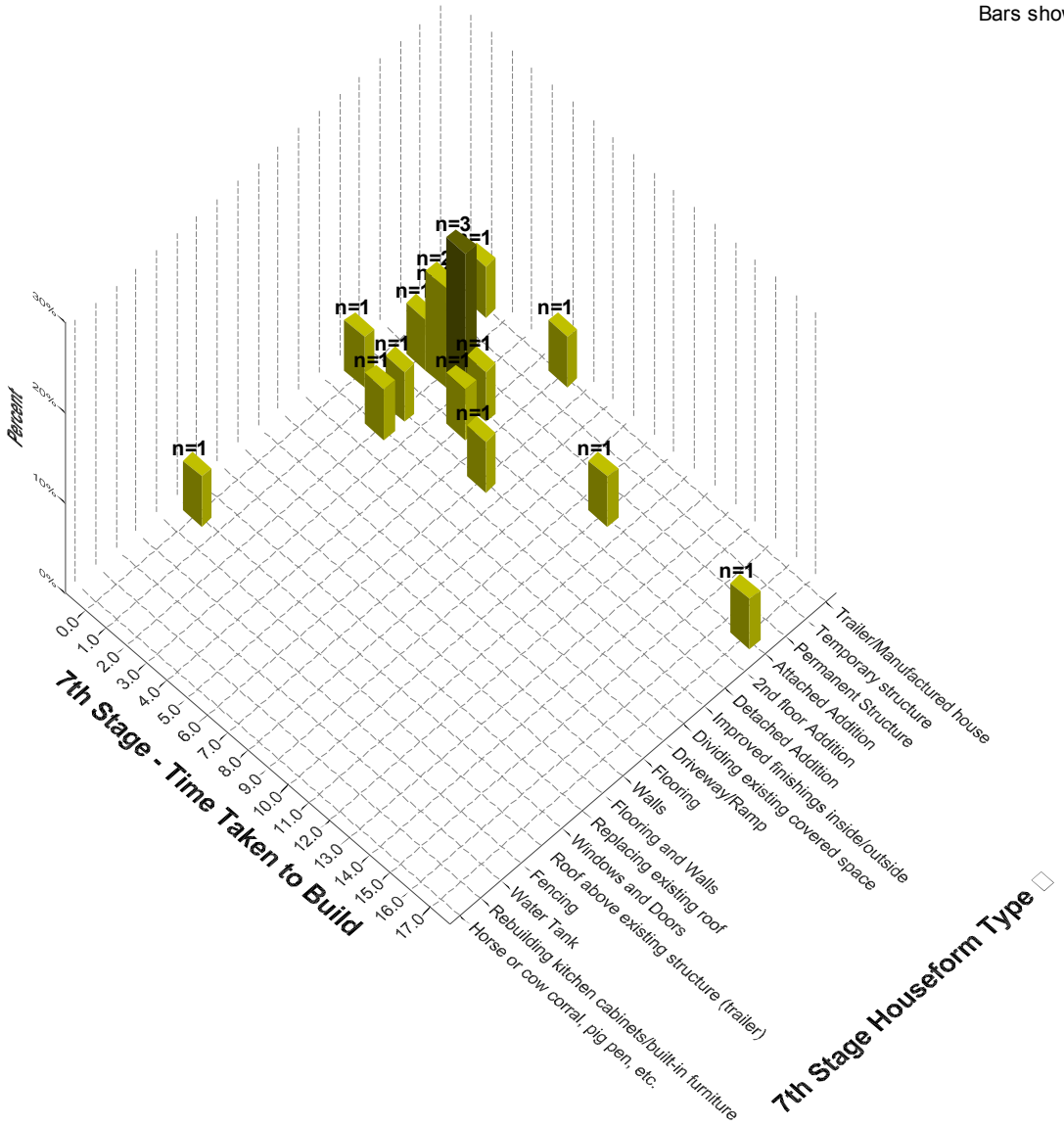


Fig A22. House form change vs. Time to build (7th stage)

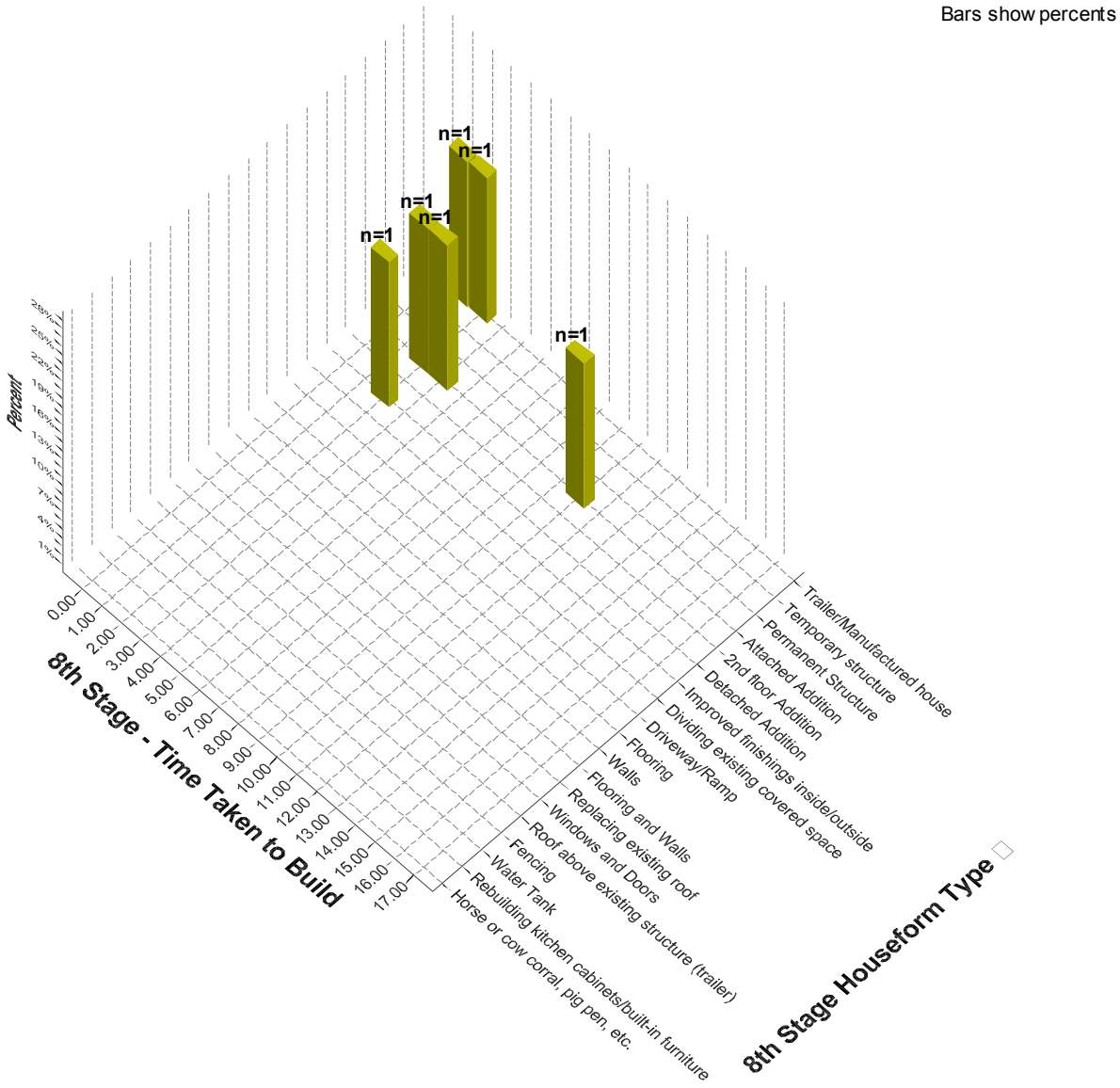


Fig A23. House form change vs. Time to build (8th stage)

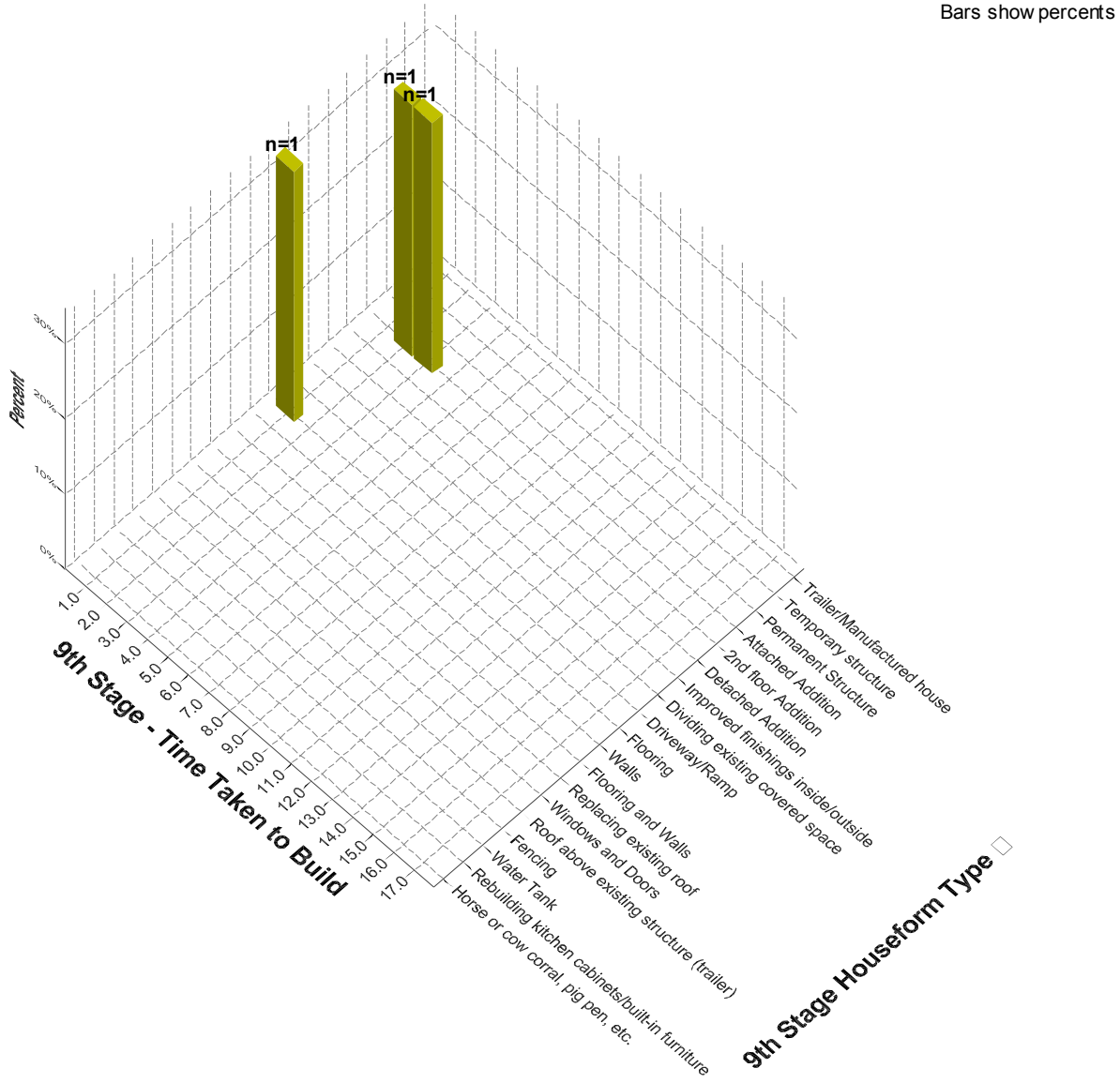


Fig A24. House form change vs. Time to build (9th stage)

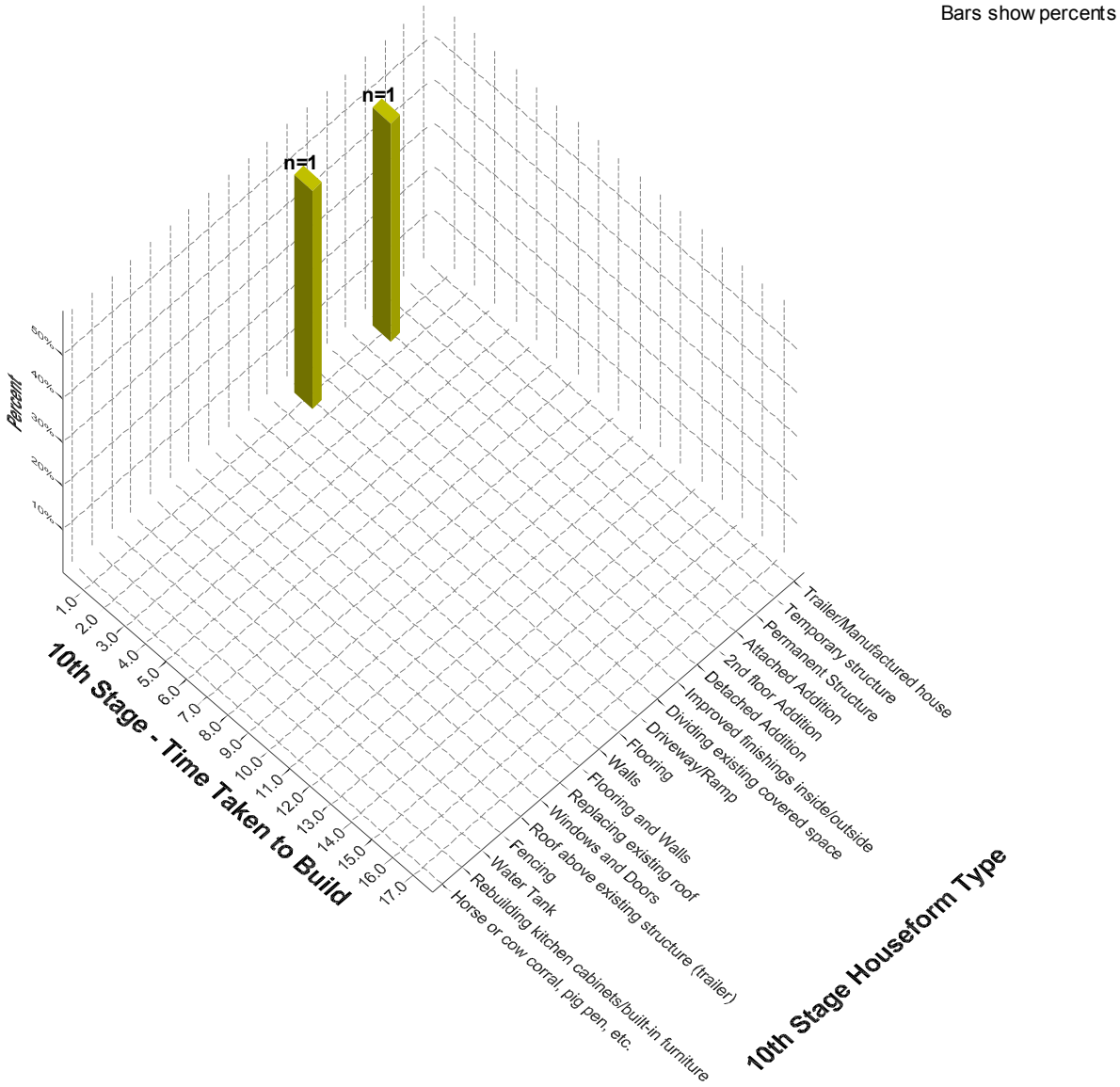


Fig A25. House form change vs. Time to build (10^{th} stage)

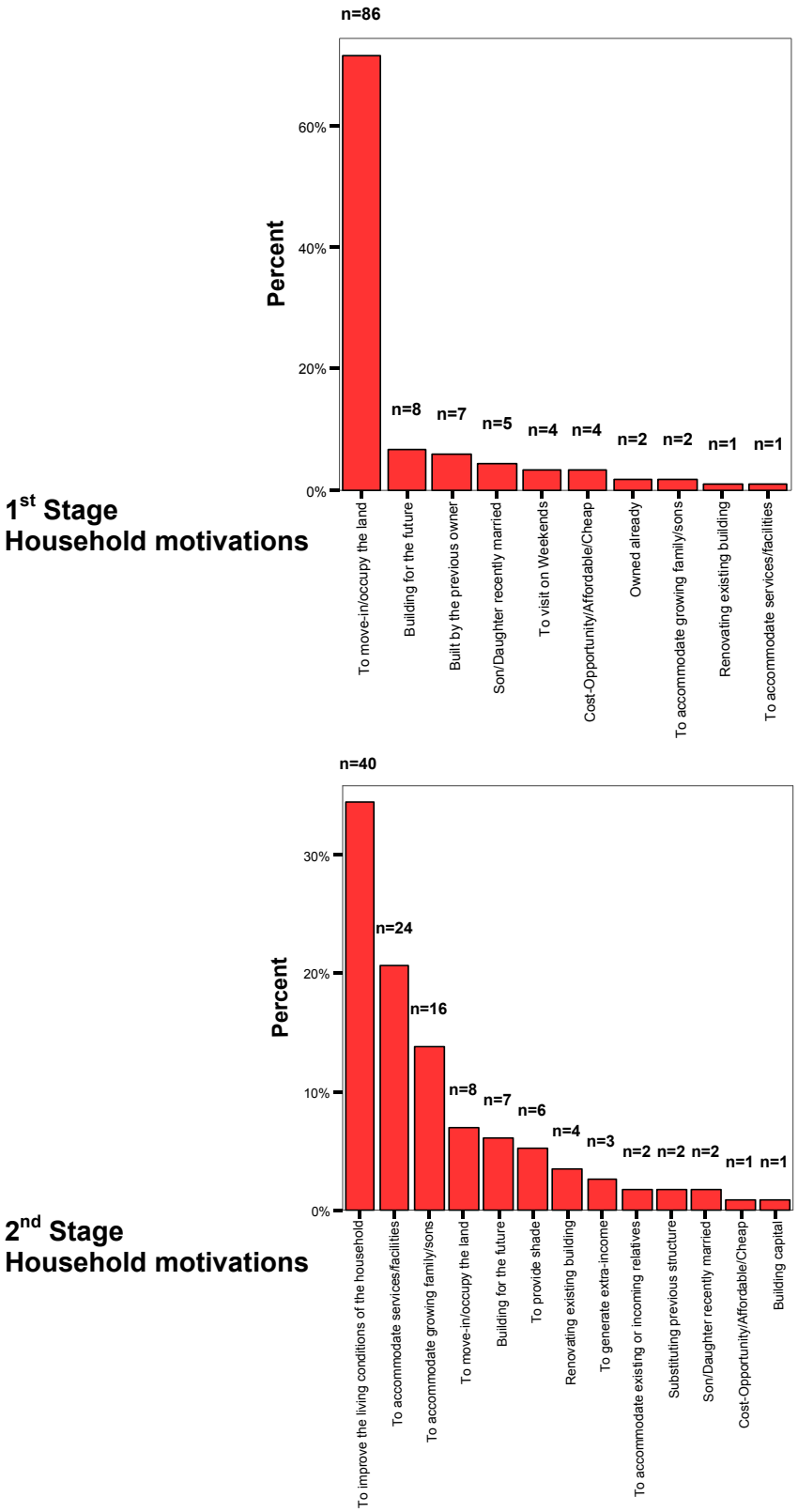


Fig A26. Household Motivations for House Form Change (1st and 2nd Stages)

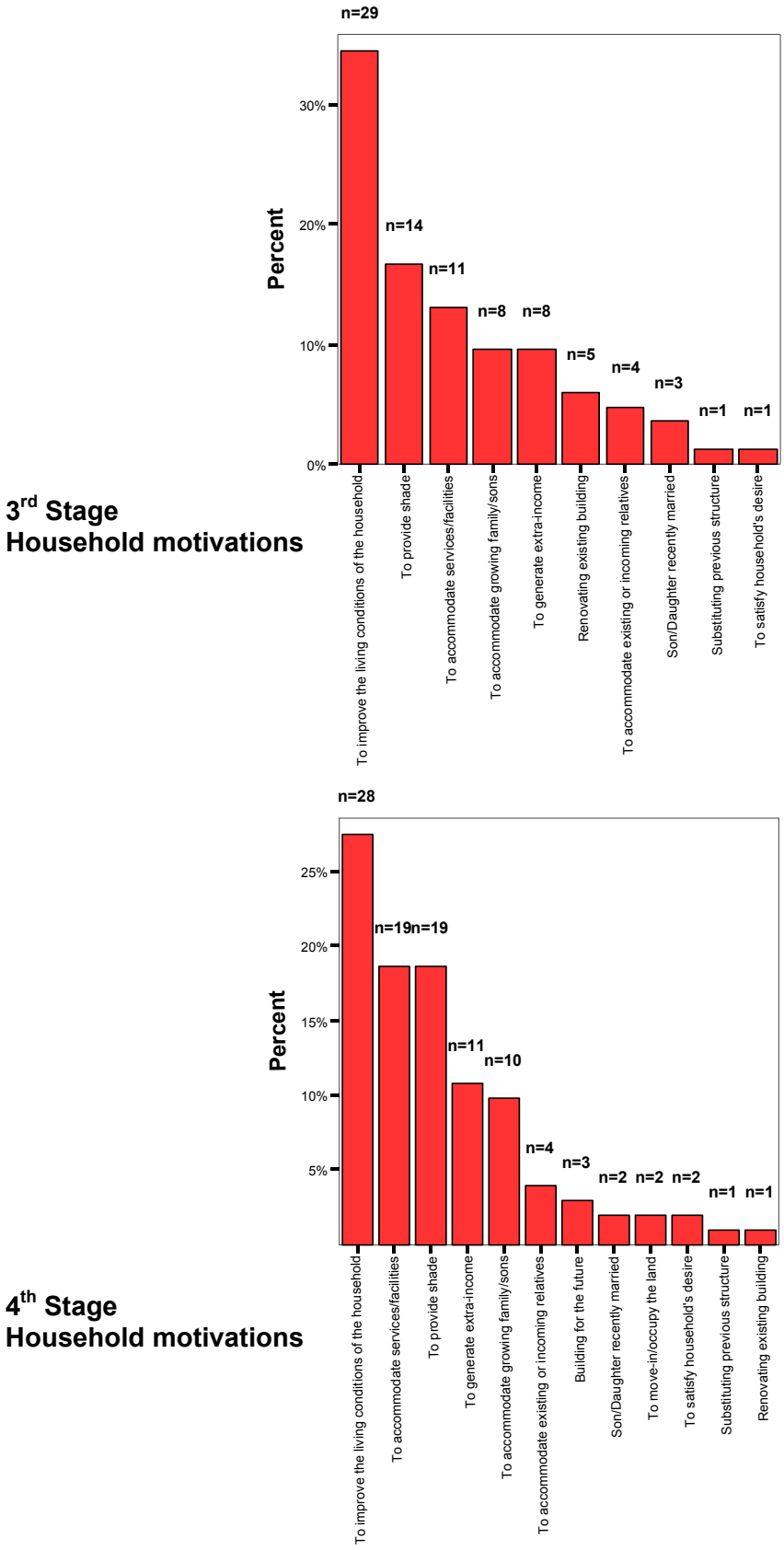


Fig A27. Household Motivations for House Form Change (3rd and 4th Stages)

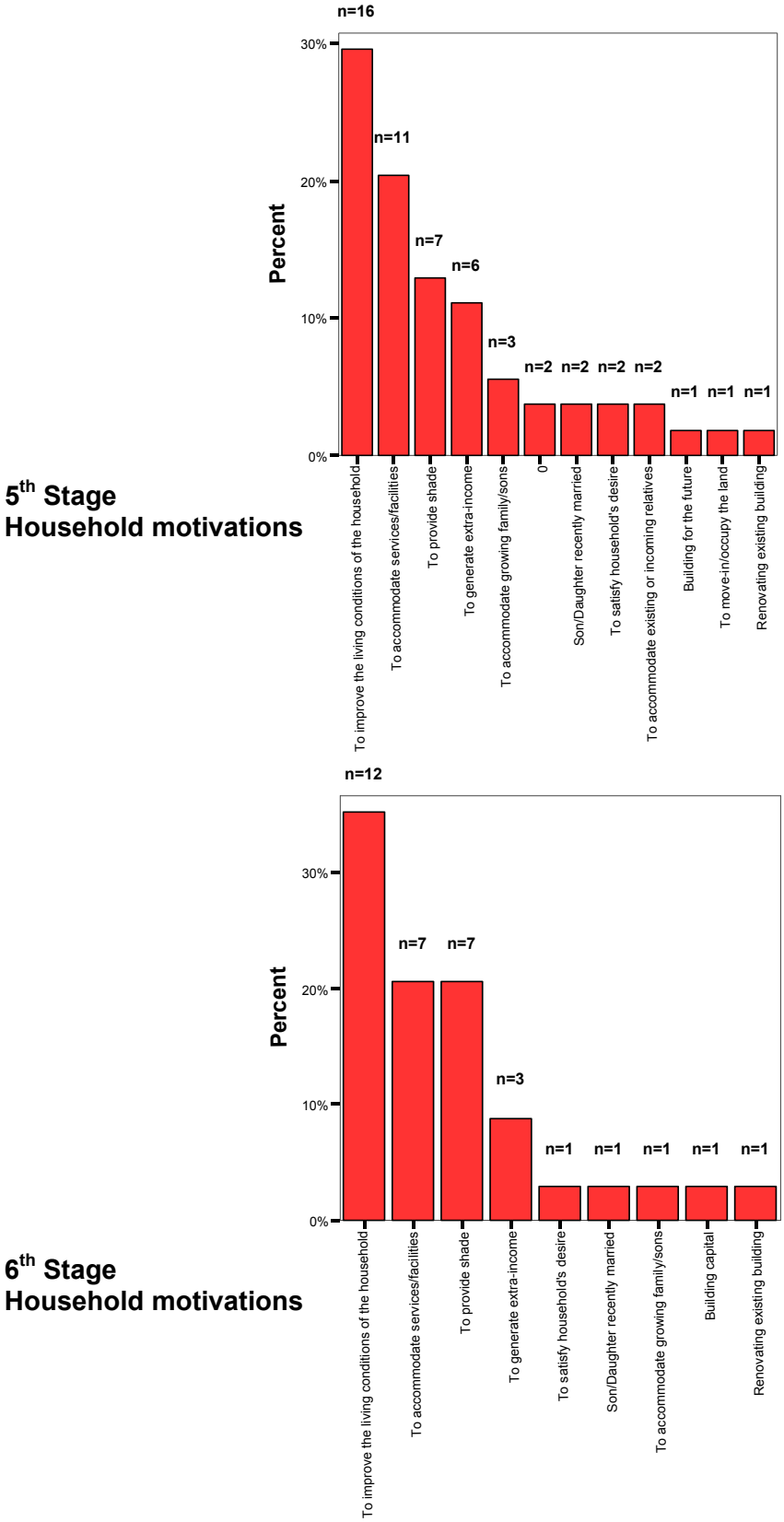


Fig A28. Household Motivations for House Form Changes (5th and 6th Stages)

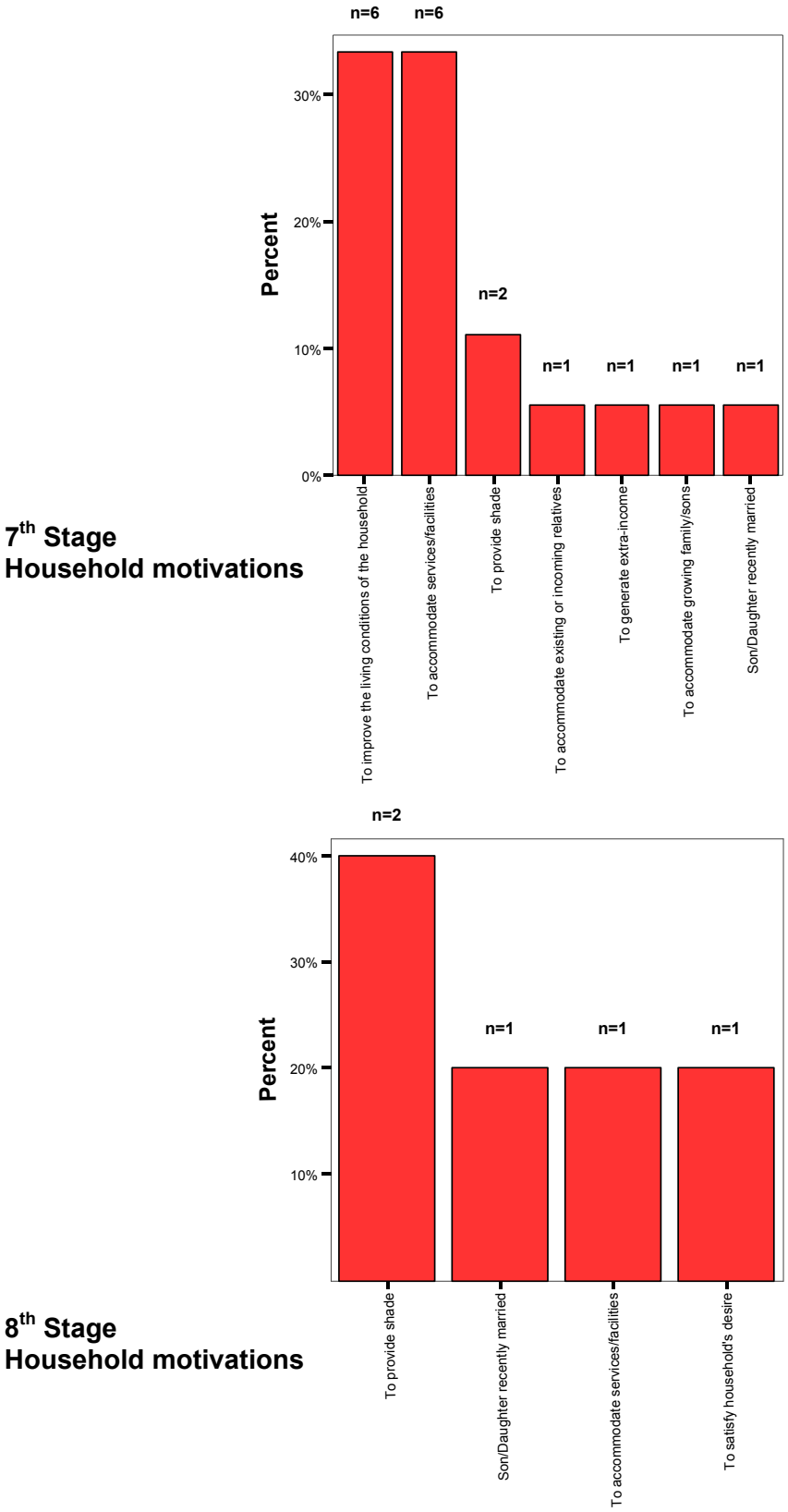


Fig A29. Household Motivations for House Form Changes (7th and 8th Stages)

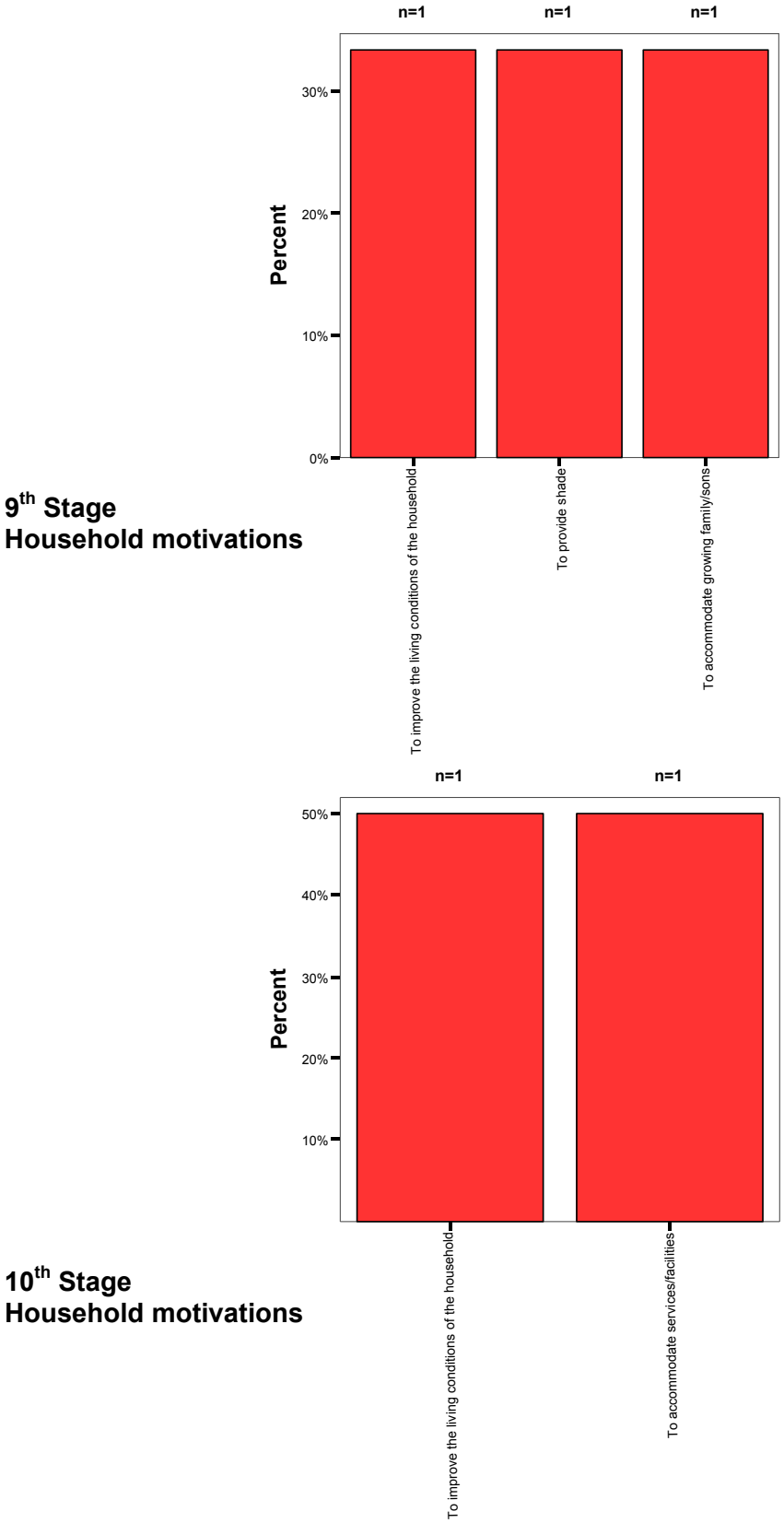


Fig A30. Household Motivations for House Form Changes (9th and 10th Stages)

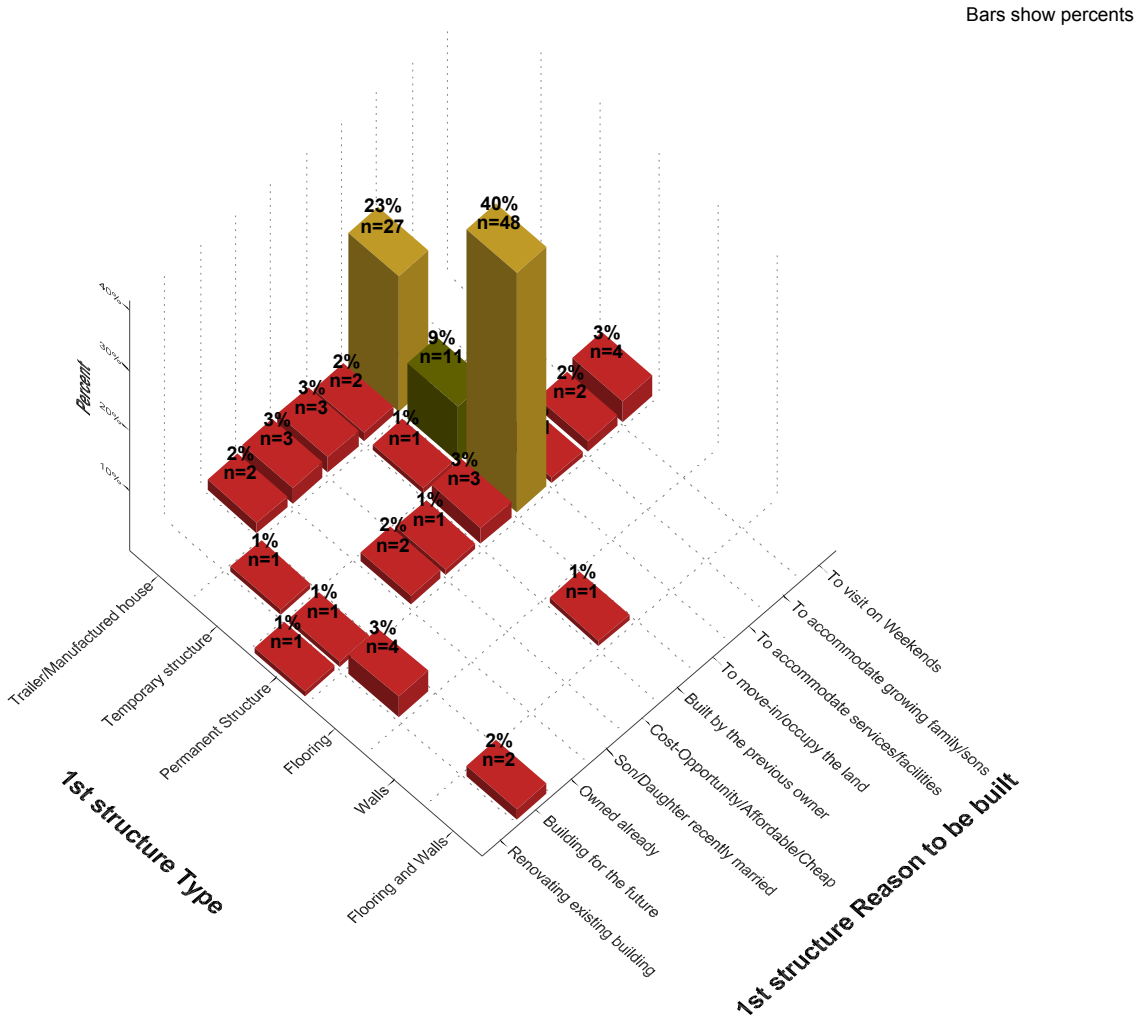


Fig A31. House form change vs. household motivations to build (stage 1)

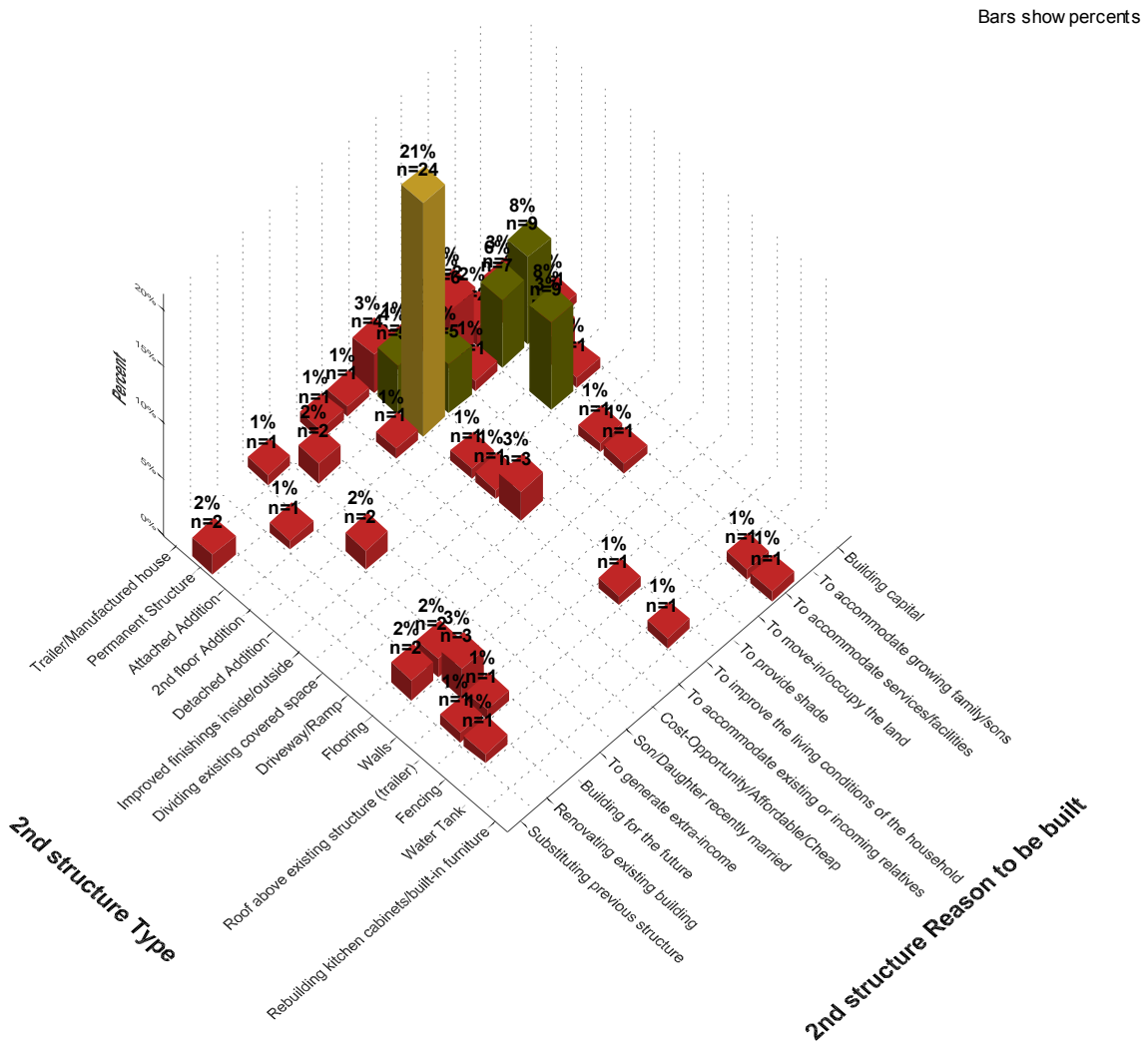


Fig A32. House form change vs. household motivations to build (stage 2)

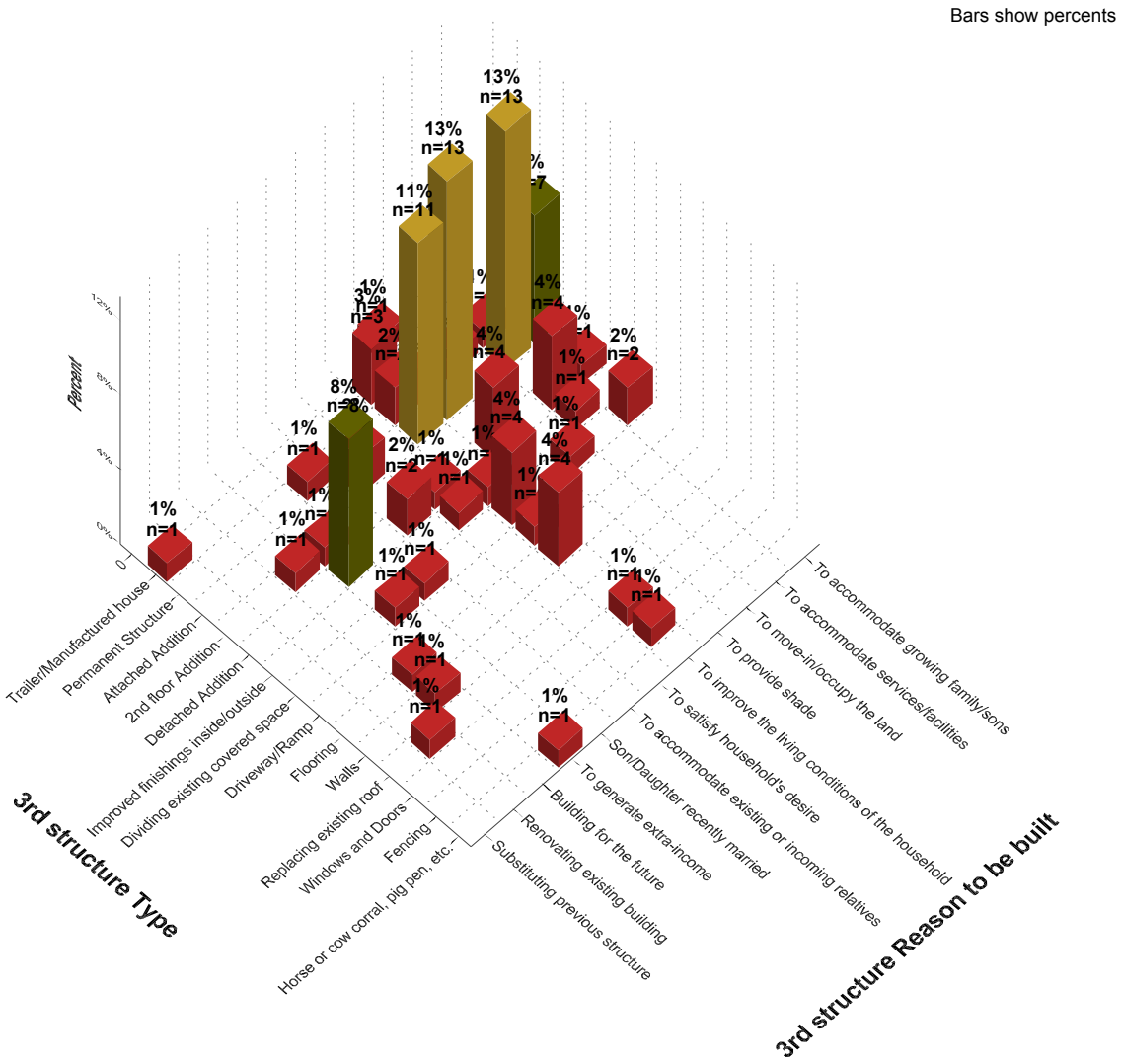


Fig A33. House form change vs. household motivations to build (stage 3)

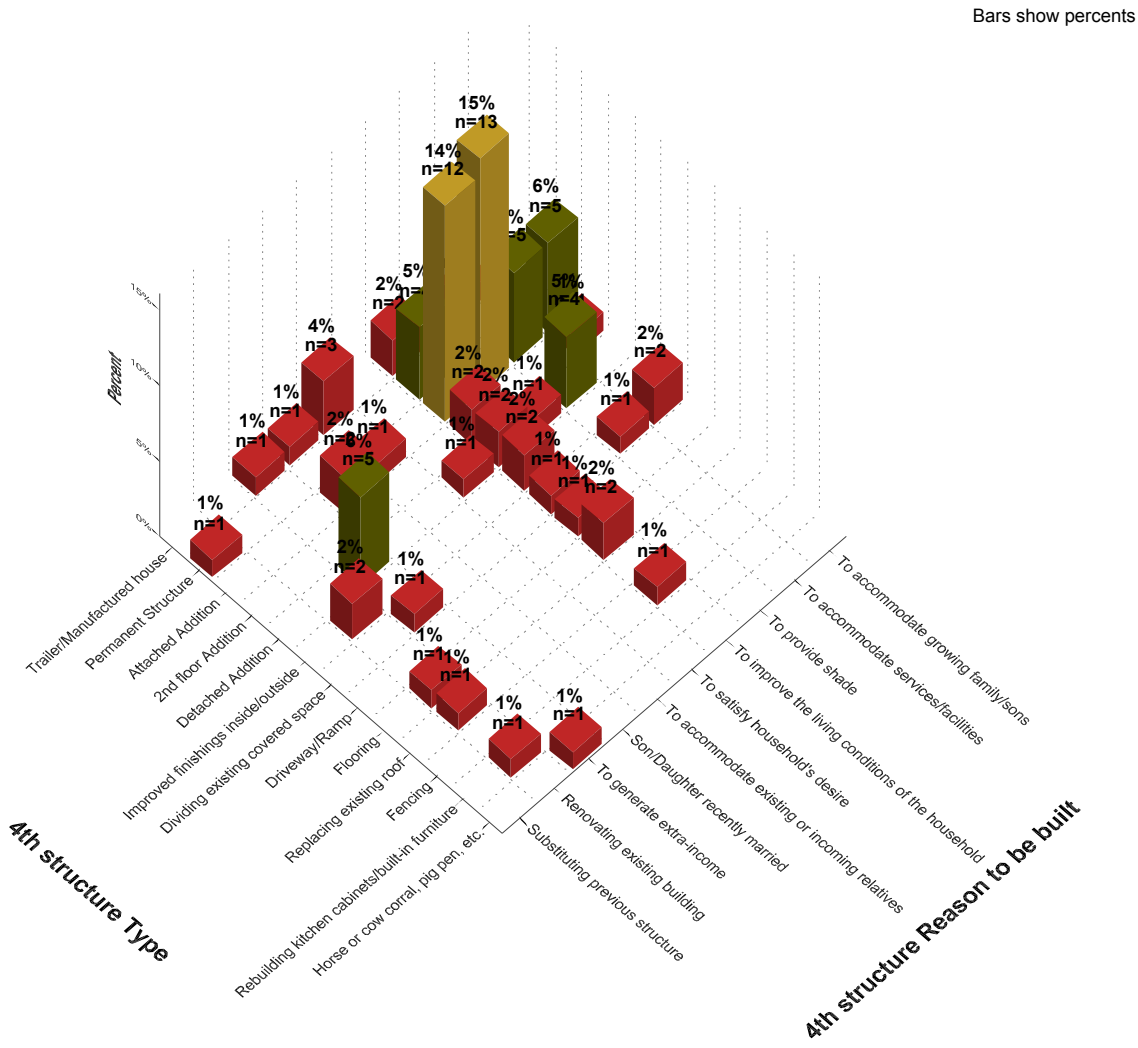


Fig A34. House form change vs. household motivations to build (stage 4)

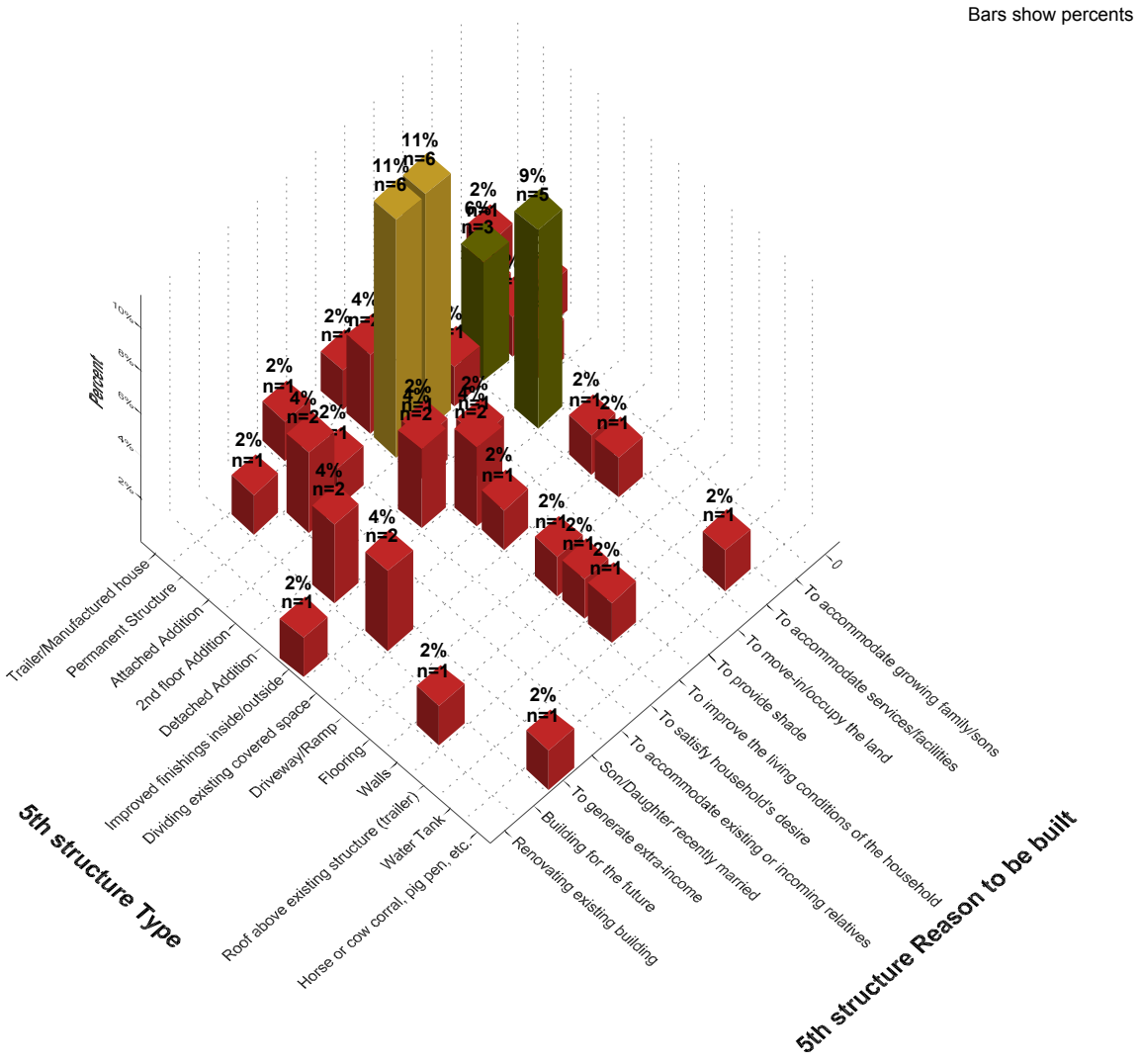


Fig 35. House form change vs. household motivations to build (stage 5)

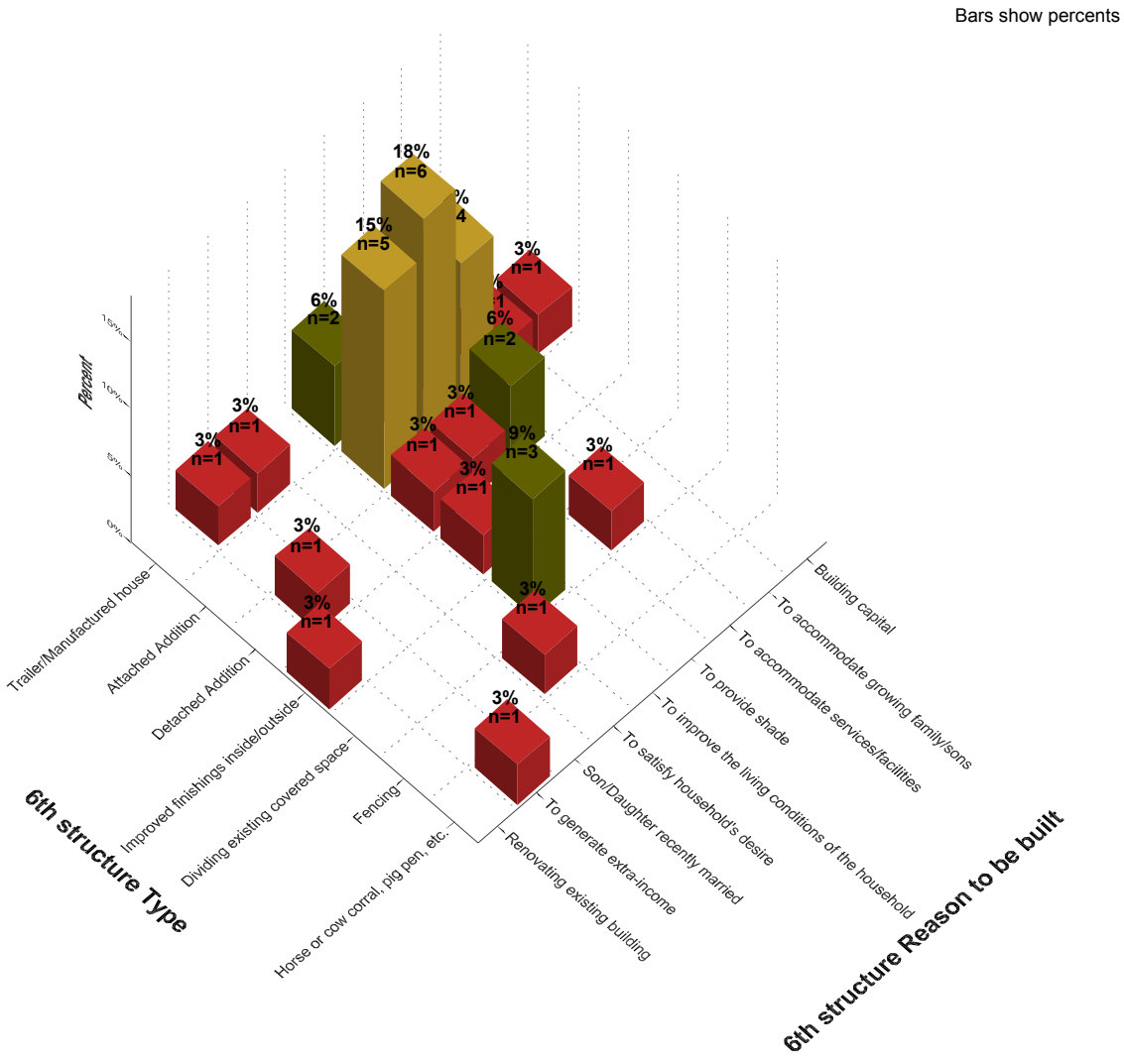


Fig A36. House form change vs. household motivations to build (stage 6)

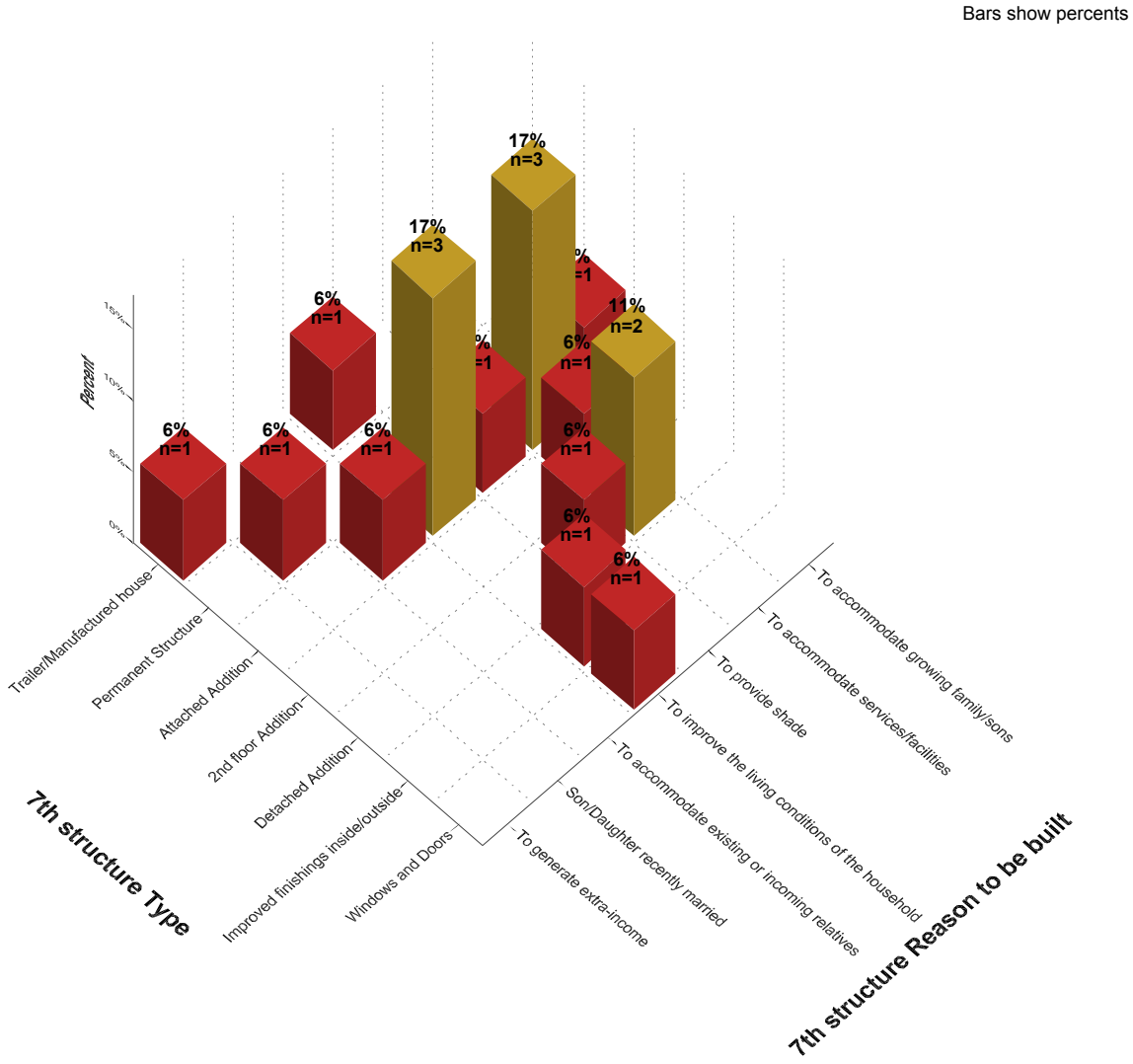


Fig A37. House form change vs. household motivations to build (stage 7)

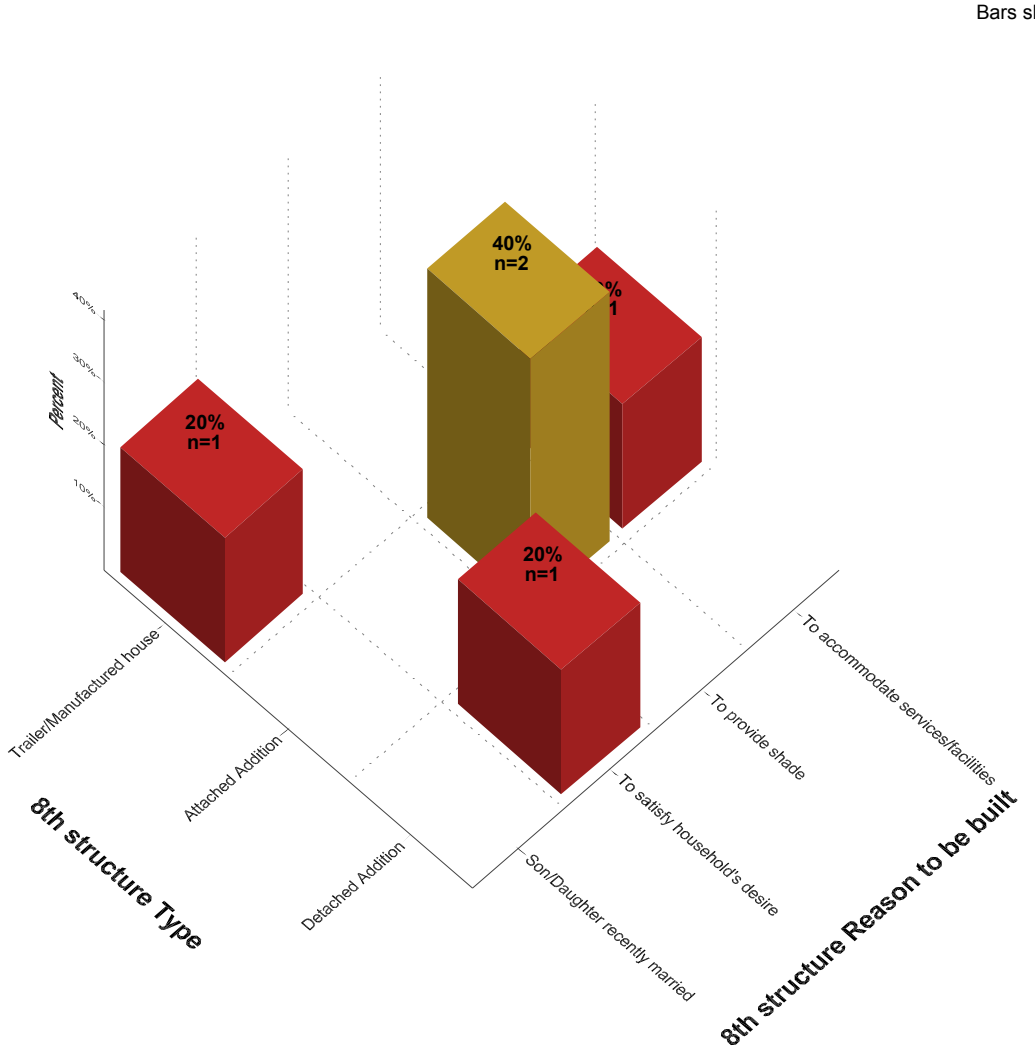


Fig A38. House form change vs. household motivations to build (stage 8)

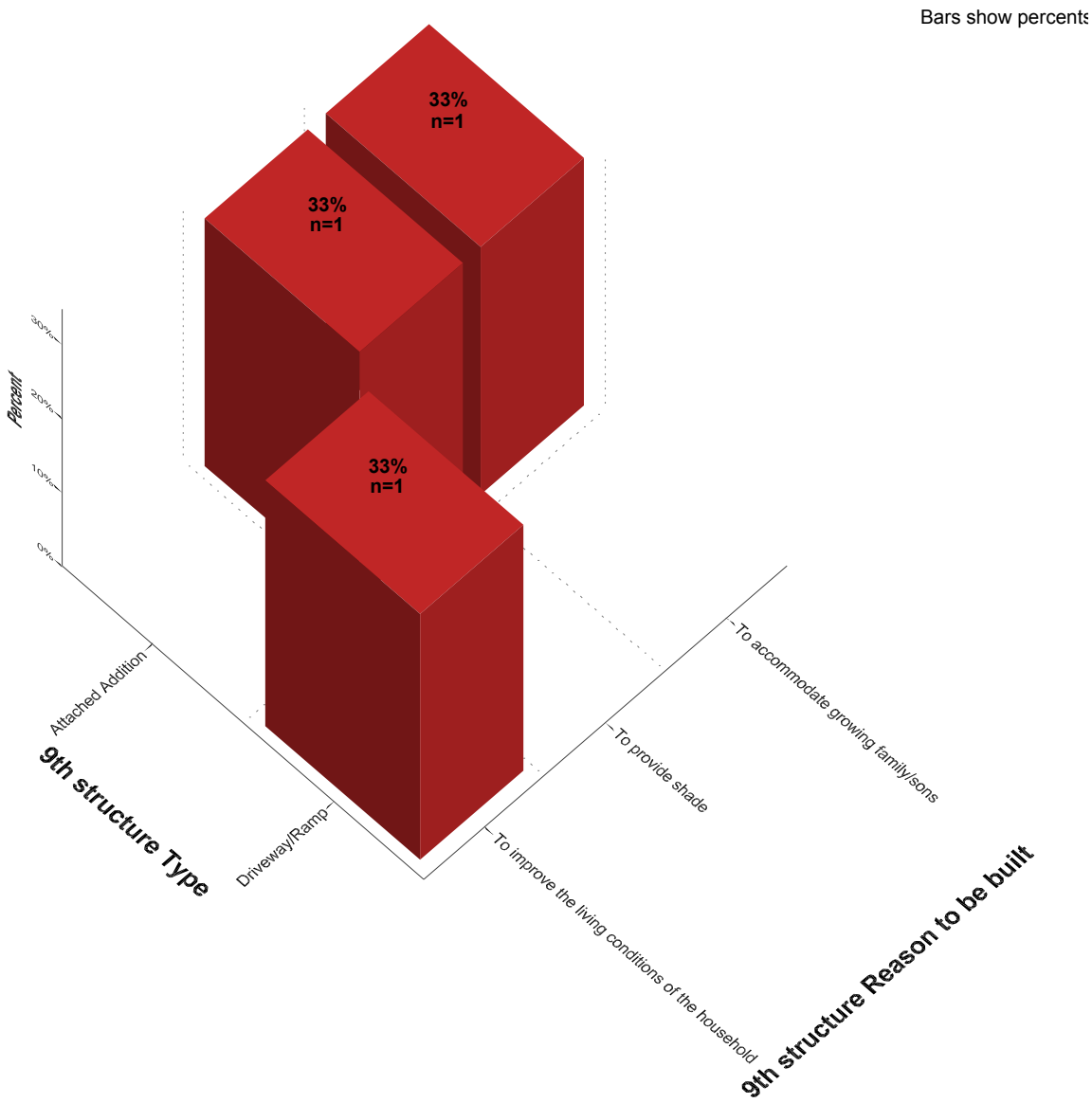


Fig A39. House form change vs. household motivations to build (stage 9)

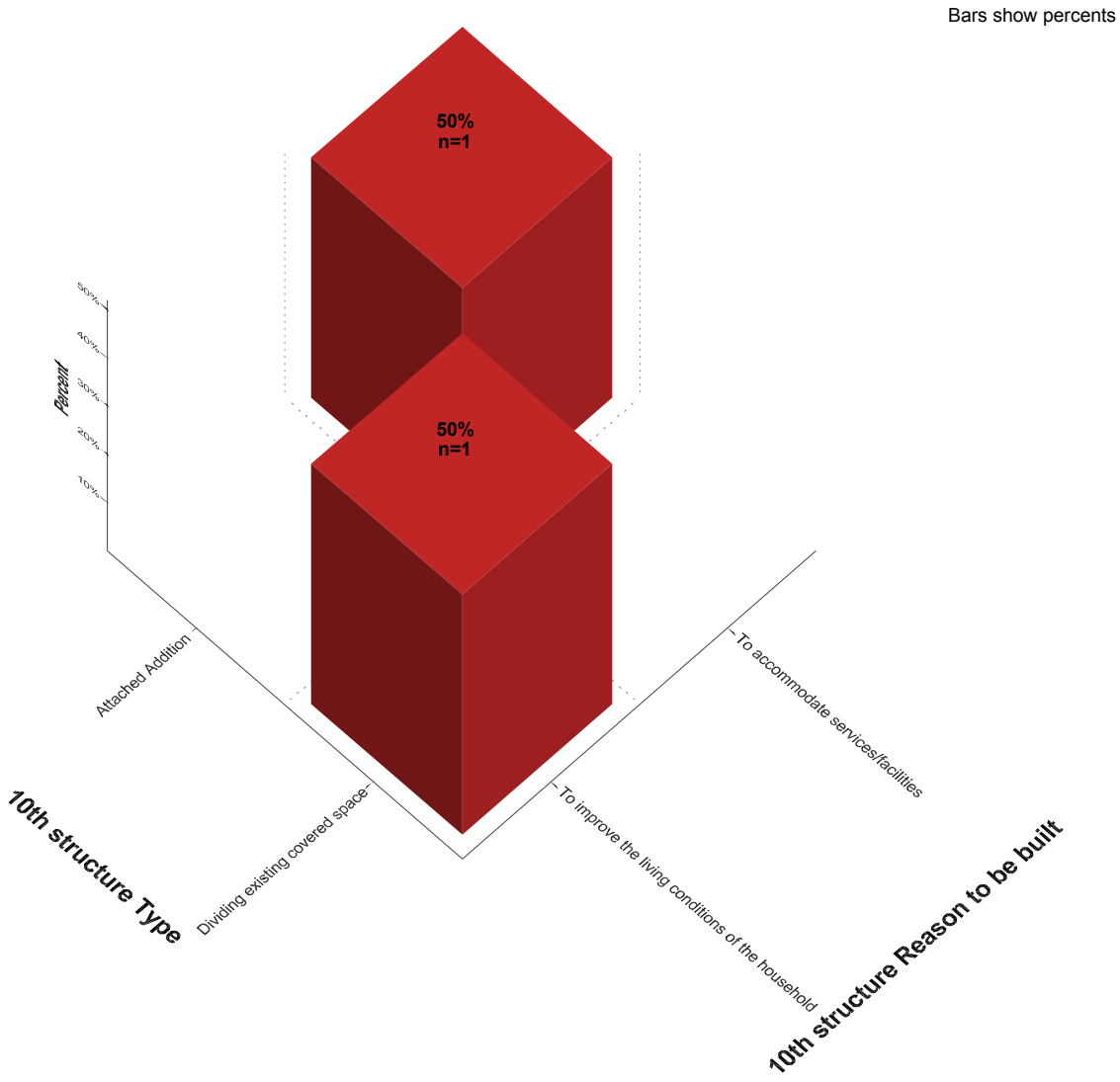


Fig A40. House form change vs. household motivations to build (stage 10)

APPENDIX B

LEGISLATION ON TEXAS COLONIAS

(Source: Texas Secretary of State)

79th Regular Session of the Texas Legislature (2005)

SB 827	Texas Government Code, Chapters 405, 487, 775 and 2306 Texas Health and Safety Code, Chapter 1001 Texas Transportation Code, Chapter 201 Texas Water Code, Chapter 6
Author:	Zaffirini
Sponsor:	Guillen
Signed by Governor Rick Perry on June 17, 2005	
Requires the Office of the Secretary of State to establish and maintain a statewide classification system to track state-funded projects related to water/wastewater, road paving and other assistance to colonias. It will require the colonias ombudsmen, Office of Rural Community Affairs, the Water Development Board, the Transportation Commission, the Department of Housing and Community Affairs, the Department of State Health Services, and/or any other appropriate agency as determined by the Secretary of State to report information to the Secretary of State for the classification system and the Secretary of State to compile and report this information to the legislature by December 1 of each even-numbered year. The classification system includes only counties within 62 miles of an international border.	

SB 1202	Texas Government Code, Chapters 775 and 2306
Author:	Lucio
Sponsor:	Chavez
Signed by Governor Rick Perry on June 17, 2005	
SB 1202 increases the number of agencies involved with colonia initiatives and requires the State-designated coordinator, the Secretary of State, to work collectively with these agencies on future colonia projects. Each agency is to designate a representative who will act as liaison between the coordinator and the agency and advise the coordinator during colonia projects. The coordinator is to also work with the colonia resident advisory committee in developing strategies and recommendations for colonia initiatives.	

SB 425	Texas Government Code, Chapter 775 Texas Local Government Code, Chapters 212 and 232 Texas Utilities Code, Chapters 37 and 54 Texas Water Code, Chapters 16 and 17
Author:	Hinojosa
Sponsor:	Luna, Seaman
Signed by Governor Rick Perry on June 17, 2005	
Amends the Local Government, Government and Water Codes so that a county that is located within 100 miles of an international border containing a city with a population of more than 250,000 can: prevent future substandard residential subdivisions from developing receive the assistance of the SOS Colonia Ombudsman Program be eligible for EDAP Funds	

HB 467	Texas Local Government Code, Chapters 212 and 232 Texas Water Code, Chapters 15, 16 and 17
Author:	Bailey, Howard, Olivo
Sponsor:	Gallegos
Signed by Governor Rick Perry on June 18, 2005	
Authorizes any city, county or EDAP applicant in the state that applies for EDAP assistance to enforce the Model Subdivision Rules. Redefines "economically distressed area" and "political subdivision" by removing the requirement that the county have an average per capita income that is at least 25 percent below the state average for the most recent three consecutive years for which statistics are available. Redefines term "affected county" to be a county that has an economically distressed area which has a median household income that is not greater than 75 percent of the median state household income.	

HB 1924	Texas Occupations Code, Chapter 162
Author:	Chavez
Sponsor:	Shapleigh
Signed by Governor Rick Perry on June 17, 2005	
Requires the State Board of Medical Examiners to grant a health organization (recognized as a hospital district capable of receiving grants by a federal agency or federally qualified health center) the ability to employ physicians if it is located in a county that is located on the border and contains a population of more than 650,000.	

HB 1823	Texas Local Government Code, Chapter 212 Texas Property Code, Chapter 5
Author:	Dutton
Sponsor:	Lucio
Signed by Governor Rick Perry on June 18, 2005	
Redefines the rights and benefits of contract-for-deed or lease-to-own homebuyers to reflect those given to any other type of homebuyer. Further reinforces protections passed in 2001 by allowing these types of buyers to obtain a title to their property without alteration of the initial financial agreement made with the seller. Sellers will maintain the same rights and privileges as any other entity financing a home sale.	

HB 775	Texas Government Code, Chapter 487
Author:	Gonzalez
Sponsor:	Lucio
Signed by Governor Rick Perry on June 18, 2005	
Amends the Government Code to require the Office of Rural Community Affairs to adopt a rule requiring a political subdivision that receives community development block grant program money targeted toward street improvement projects to allocate a percentage of those funds towards installation of street lights in colonias.	

78th Regular Session of the Texas Legislature (2003)

HB 1875	Texas Water Code, Chapter 966 and 1234
Author:	Wise
Sponsor:	Lucio
Signed by Governor Rick Perry on June 20, 2003	
Allows the rural water assistance fund to be used to provide low interest loans to rural political subdivisions for water or water related projects and for water quality enhancement projects. Allows the rural water assistance fund to be used to enable a rural political subdivision to obtain water or wastewater service supplied by larger political subdivisions or to finance the consolidation or regionalizing of neighboring political subdivisions. Establishes the colonia self-help account as an account in the water assistance fund that may be used by the Texas Water Development Board only for purposes described in the Water Code.	

HB 3420	Texas Government Code, Chapter 1403
Authors:	Garza, Guillen
Sponsor:	Madla
Signed by Governor Rick Perry on June 18, 2003	
Provides for a set-aside of funds generated from the general obligation bonds issued under S.B. 1296, 77th Session, for specific colonia access roadway projects proposed by rural border counties.	

77th Regular Session of the Texas Legislature (2001)

SB 1296	Texas Government Code, Chapter 1403
Author:	Lucio
Coauthors:	Shapleigh, Sibley, Truan, Zaffirini
Sponsors:	Flores
Signed by Governor Rick Perry on June 14, 2001	
Allows the Texas Public Finance Authority to issue general obligation bond and notes with the proceeds to be used to aid counties to fund roadway projects to serve colonias.	

HB 2700	Texas Government Code, Chapter 531 Texas Local Government Code, Chapter 386
Author:	Chavez, Puente, Wohlgemuth, J. Solis, Chisum
Sponsors:	Duncan
Signed by Governor Rick Perry on June 13, 2001	
Requires the Health and Human Services Commission to establish telemedicine pilot programs in medically underserved areas; provides for reimbursement and regulation of telemedicine services.	

SB 1	(General Appropriations Act, 2002-2003)
Author:	Ellis, Rodney
Sponsors:	Junell
Signed by Governor Rick Perry on June 17, 2001	
Establishes the Texas Bootstrap Loan Program to provide low-income families with loans to purchase or refinance real property. Appropriates funding for the Colonia Model Subdivision Revolving Loan Program and the Contract for Deed Conversion Program.	

HB 1053	Texas Tax Code, Chapter 311
Author:	Coleman
Sponsors:	Gallegos
Signed by Governor Rick Perry on June 16, 2001	
Authorizes municipalities and counties to create commercial and industrial development zones in areas of pervasive poverty, unemployment, or economic distress to promote and encourage commercial and business development.	

SB 198	Texas Property Code, Chapter 5
Author:	Moncrief
Sponsors:	Carter, Wise
Signed by Governor Rick Perry on June 13, 2001	
Requires that a seller provide a buyer with certain written information and disclosures when using a contract for deed in one of the designated counties. Requires that if the contract is negotiated in a language other than English, the seller must provide copies of all documents in that language.	

SB 312	Texas Water Code, Chapters 6, 15, 16 and 17
Author:	Zaffirini
Sponsors:	Chisum
Signed by Governor Rick Perry on June 15, 2001	
Creates the Colonia Advisory Committee and the Pilot Program for Water and Wastewater Loans for Rural Communities. Provides funding for the colonia self help program.	

SB 322	Texas Government Code, Chapters 775, 1372 and 2306; Texas Tax Code, Chapter 11B; Texas Water Code, Chapter 15
Author:	Lucio
Sponsors:	Gallego, Carter
Signed by Governor Rick Perry on June 16, 2001	
Establishes self help centers, the colonia model subdivision revolving loan fund, and the colonia model subdivision program. Requires the colonia initiatives coordinator to work with other agencies and local officials involved in colonia projects in Texas.	

SB 649	Texas Water Code, Chapter 17
Author:	Truan
Co-Author	Zaffirini
Sponsors:	Flores
Signed by Governor Rick Perry on June 13, 2001	
Requires training for applicants and recipients of financial assistance from the economically distressed area program (EDAP).	

76th Regular Session of the Texas Legislature (1999)

HB 1982	Texas Local Government Chapter 43
Author:	Hill, Cuellar, Olivo, Oliveira, Ehrhardt
Sponsor:	Truan
Signed by Governor George W. Bush on May 24, 1999	
Allows colonias to participate in state-funded programs for a period of five years after being annexed by a city to encourage municipal annexation of colonias by alleviating some of the financial burden on the city.	

SB 89	Texas Local Government Code, Chapters 42 and 43
Author:	Madla
Coauthor:	Lindsay
Sponsors:	Bosse, Hilbert, Crabb, Krusee
Signed by Governor George W. Bush on June 19, 1999	
Revises the municipal annexation process to require cities to implement advance annexation planning procedures and ensure the timely provision of services to the annexed areas; provides penalties for violations.	

SB 1287	Texas Government Code, Chapter 2306 Texas Water Code, Chapter 17
Author:	Lucio
Coauthors:	Shapleigh, Truan, Zaffirini
Sponsors:	Oliveira, Carter, Bailey, Hill, Ehrhardt
Cosponsors:	Burnam, Clark, Edwards, Hodge, Najera
Signed by Governor George W. Bush on June 19, 1999	
Allows the Texas Department of Housing and Community Affairs to provide housing loans to low-income owner-builders through the colonia self-help centers.	

SB 1421	Texas Local Government Code, Chapter 232 Texas Government Code, Chapter 775 Texas Water Code, Chapters 5, 13, 15, 16 and 17
Author:	Lucio
Coauthors:	Moncrief, Shapleigh, Truan, Zaffirini
Sponsors:	Cuellar, Hinojosa, Gutierrez, Flores, Pickett
Cosponsor:	Wise
Signed by Governor George W. Bush on June 17, 1999	
Establishes provisions regarding the regulation of the subdivision or development of land in certain economically distressed areas, including colonias: provides penalties for violations.	

75th Regular Session of the Texas Legislature (1997)

HB 540	Texas Government Code, Chapter 2306
Author:	Serna
Sponsor:	Shapleigh
Signed by Governor George W. Bush on May 28, 1997	
Provides for educational programs to be offered to colonia residents by the Texas Department of Housing and Community Affairs.	

HB 2252	Texas Human Resources Code, Chapter 40 Texas, Chapters 481 and 2306 Texas Parks and Wildlife Code, Chapter 24
Author:	Oliveira
Sponsor:	Truan
Signed by Governor George W. Bush on June 20, 1997	
Provides funding to a variety of colonia-related social service programs administered through the Centers for Housing and Urban Development.	

HB 2798	Texas Local Government Code Chapter 394
Author:	Marchant
Sponsor:	Carona
Signed by Governor George W. Bush on June 20, 1997	
Allows for more flexibility for the Bond Review Board (BRB) to administer the Private Activity Bond Allocation Program. Establishes provisions regarding tax-exempt private activity bonds regulated by the BRB.	

74th Regular Session of the Texas Legislature (1995)

HB 1001	Texas Local Government Code, Chapter 232 Texas Water Code, Chapter 13, 16, 17 and 26
Author:	Cuellar
Sponsor:	Zaffirini
Signed by Governor George W. Bush on June 16, 1995	
Gives affected counties enforcement authority to regulate subdivisions in economically distressed areas by imposing platting requirements and service requirements on persons selling property. Imposes civil and criminal penalties for failure to comply with the requirements.	

HB 2726	Texas Government Code, Chapter 1372 Texas Local Government Code, Chapter 349
Author:	Romo
Sponsor:	Montford
Signed by Governor George W. Bush on June 16, 1995	
Clarifies and simplifies the allocation process for tax-exempt private activity bonds and authorizes the Texas Bond Review Board to administer the program.	

SB 450	
Author:	Rosson
Sponsor:	McDonald, Haggerty
Cosponsors:	Moreno, Pickett
Signed by Governor George W. Bush on May 11, 1995	
Gives the City of El Paso the authority to conduct regional water and wastewater planning.	

SB 542	Texas Local Government Code, Chapter 232
Author:	Rosson
Sponsor:	Truan
Cosponsor:	Oliveira
Signed by Governor George W. Bush on June 5, 1995	
Provides conditions and procedures for canceling certain platted subdivisions if the land has not been developed so that the subdivisions will not have grandfathered exemption from the requirements for adequate water and wastewater facilities.	

SB 1509	Texas Government Code Chapter 2306
Authors:	Zaffirini, Truan, Moncrief, Lucio, Barrientos
Coauthors:	Madla, Montford, Rosson, Rosson
Sponsor:	Cuellar, Henry
Signed by Governor George W. Bush on June 17, 1995	
Creates colonia self-help centers to provide home financing assistance, counseling, a tool library, instruction, and technical assistance on installation and financing for septic systems.	

73rd Regular Session of the Texas Legislature (1993)

HB 997	Texas Water Code Chapter 15
Author:	Oliviera
Sponsor:	Montford
Signed by Governor Ann W. Richards on June 19, 1993	
Expands the receipt of funds in the water assistance fund and the water development fund to further implement the program to assist economically distressed areas.	

HB 2079	Texas Local Government Code Chapter 232 Texas Water Code Chapter 16 Texas Health and Safety Code, Chapter 341
Author:	Cuellar
Sponsor:	Zaffirini
Signed by Governor Ann W. Richards on June 12, 1993	
Authorizes counties to solicit help from the Office of Attorney General (OAG) to enforce state health and safety laws related to nuisance violations and on-site sewage facilities. Allows OAG to request injunctions against violations of county subdivision rules in established developments and to sue for damages when violations occur.	

72nd Regular Session of the Texas Legislature (1991)

SB 818	Texas Water Code, Chapters 15 and 26
Author:	Barrientos
Sponsor:	Saunders
Signed by Governor Ann W. Richards on June 7, 1991	
Sets water quality standards and establishes the Colonia Plumbing Loan Program to offer low-interest loans to colonia residents for individual home water and wastewater system installations and for indoor plumbing improvements.	
SB 1189	Texas Local Government Code, Chapter 232
Author:	Montford
Sponsor:	Oliveira
Signed by Governor Ann W. Richards on June 7, 1991	
Requires local regulation of water supplies and sewer services in economically distressed areas.	

71st Regular Session of the Texas Legislature (1989)

SB 2	Texas Water Code, Chapters 15 and 16
Author:	Santiesteban
Sponsor:	Moreno, Smith
Signed by Governor William P. Clements on June 14, 1989	
Establishes the Economically Distressed Areas Program(EDAP) to provide water and wastewater services to colonia residents who can not afford them also ensures that new rural residential subdivisions have water and wastewater services installed.Provides for the issuance of bonds.	

70th Regular Session of the Texas Legislature (1987)

SB 585	Texas Water Code, Chapters 15, 16 and 17
Author:	Santiesteban
Sponsor:	Smith
Signed by Governor William P. Clements on June 20, 1987	
Authorizes the Texas Water Development Board (TWDB) to provide grants and loans for water and wastewater services for colonias.	

Source: Texas Secretary of State 10/08 (http://www.sos.state.tx.us/border/colonias/legislation.shtml)

APPENDIX C

COMPLETE SURVEY PACKAGE

- Survey Instrument (English/Spanish)

- Interviewee Incentive Invoice

- Guide for the Interviewer (English/Spanish)

- Survey Flyer

SURVEY

Housing Diversity and Consolidation in Colonias
Texas A&M University, Dept. of Architecture.

February, 2007.

Dear Sir/Madam, my name is _____ and I am working in a study for the College of Architecture at Texas A&M University. The study is part of a doctoral research about the relationship between housing and residents in the Colonias of Webb County, Texas. The purpose of the study is to define the particular ways in which housing in colonias is built over time and how households participate in this process. We are paying special attention to the relationships and interactions developed between the house and its residents. Your house was selected as part of a sample of 160 houses identified in a preliminary study of this colonia.

We would like to include your house and household in our study. If you agree to participate, you will need to answer several questions about the process by which the house was built and the way the members of your household participated in its construction. These questions will take about 30 minutes to answer and the information that you provide will be for research purposes only and is very important to successfully complete this study. Your participation in this study will be confidential and your name, the name of the household members, and your particular address will be protected and safeguarded. This information will not be shared or included in any reports or publications of this study. You can choose not to answer a question at any time. At the completion of the survey, you will receive a Walmart $10.00 gift card or a small gift of equivalent value as our expression of appreciation for you participation.

If you have any additional questions or concerns now or at any time after you participate in this study, please contact or call the principal investigator Carlos Reimers at the Department of Architecture, TAMU 3137, College Station, TX 77843-3137, phone 979-4580445, in Spanish or English. This research study has been reviewed by the Institucional Research Borrad – Human Subjects in Research, Texas A&M University. For any question or issues related with subject's rights, you can contact Ms. Melissa McIlhaney, IRB Program Coordinator at Office of Research Compliance, Institutional Research Board at (979) 4584067.

Sincerely,

Carlos Reimers
Principal Investigator
Department of Architecture, Texas A&M University
Williams Bdg. 008C, Phone 979-4580445. College Station, Texas 77843-3137

ENCUESTA

Diversidad y Consolidación de la Vivienda en Colonias

Texas A&M University, Depto. de Arquitectura.

Febrero, 2007.

Estimada Señora/Señor, mi nombre es _____ y estoy haciendo una encuesta para un estudio del College de Arquitectura de Texas A&M University. El estudio es parte de un trabajo de doctorado sobre la relación entre la vivienda y sus residentes en las Colonias de Webb County, Texas. El propósito del estudio es definir la forma específica en que la vivienda se construye a través del tiempo en las colonias, y como los residentes participan en el proceso de construirla. Tenemos especial interés en la relación e interacción que se desarrolla entre la vivienda y sus residentes. Su vivienda ha sido seleccionada como parte de una muestra de 160 viviendas identificada en un estudio preliminar en esta colonia.

Nos gustaría incluir su vivienda y su grupo familiar en nuestro estudio. Si acepta participar, usted necesitará contestar varias preguntas acerca de la forma en que su vivienda fué construida y la manera en la que sus residentes participaron en la construcción. Contestar estas preguntas tomará unos 30 minutos y la información que usted suministre será utilizada únicamente para este propósito y es muy importante para el éxito de este estudio. Su participación en el estudio será confidencial y su nombre, el nombre de los residentes y su dirección particular serán resguardados y protegidos. Esta información no será compartida ni incluida en los reportes o publicaciones de este estudio. Usted puede decidir no contestar cualquier pregunta en cualquier momento. Al completar esta encuesta recibirá una tarjeta de Walmart de $10 o un pequeño regalo de valor similar como muestra de aprecio por su participación.

Si usted tuviera otras preguntas ahora o en cualquier momento después de participar en esta encuesta, por favor contacte o llame al responsable de este estudio Carlos Reimers en el Departamento de Arquitectura, TAMU 3137, College Station, TX 77843-3137, teléfono 979-4580445, en Español o Inglés. Este estudio ha sido revisado por el Institutional Research Board – Human Subjects in Research, Texas A&M University. Para preguntas o asuntos relacionados con los derechos de sujetos humanos, contacte a Ms. Melissa McIlhaney, Program Coordinator en la Oficina de Research Compliance, Institutional Research Board al (979) 4584067.

Atentamente,

Carlos Reimers
Investigador Responsable
Departamento de Arquitectura, Texas A&M University
Williams Bdg. 008C, Teléfono 979-4580445. College Station, Texas 77843-3137

Information provided is for the solely purpose of this study only and will be treated with confidentiality safeguarding the identity of the informants

I. Household identification

House Address _____

II. Household chart

Draw a tree diagram of the household starting with the household head at the top and following with each member as related with the head. For each member of the household fill the information requested in the following page. If there are more members than spaces provided, please add the information in the other side of the page.

1. _____ Household head

2. _____ H.Head Partner

3. _____ (relationship) _____

4. _____ (relationship) _____

5. _____ (relationship) _____

6. _____ (relationship) _____

7. _____ (relationship) _____

8. _____ (relationship) _____

9. _____ (relationship) _____

10. _____ (relationship) _____

Sons and Daughters

11. _____ (relationship) _____

12. _____ (relationship) _____

13. _____ (relationship) _____

14. _____ (relationship) _____

15. _____ (relationship) _____

16. _____ (relationship) _____

17. _____ (relationship) _____

18. _____ (relationship) _____

Other member-minors related and unrelated to the main household (name relationship with the household head)

19. _____ (relationship) _____

20. _____ (relationship) _____

21. _____ (relationship) _____

22. _____ (relationship) _____

23. _____ (relationship) _____

24. _____ (relationship) _____

25. _____ (relationship) _____

26. _____ (relationship) _____

Other member-adults related and unrelated to the main household (name relationship with the household head)

La información suministrada sirve al único propósito de este estudio y será tratada confidencialmente preservando la identidad de los informantes

I. Identificación del Grupo Residente

Dirección de la vivienda_____

II. Hoja del Grupo Residente

Dibuje un diagrama del grupo residente comenzando con el jefe del grupo en el espacio numero 1. y siguiendo con cada miembro de acuerdo a su relación con el jefe. Para cada miembro del grupo residente complete la información solicitada en la página siguiente. Si hiciera falta mas espacio, por favor añada la información en el otro lado de esta página.

	1. _____ Jefe del grupo residente	2. _____ Pareja del Jefe del grupo	
3. _____ (relación) _____	4. _____ (relación) _____	5. _____ (relación) _____	6. _____ (relación) _____
7. _____ (relación) _____	8. _____ (relación) _____	9. _____ (relación) _____	10. _____ (relación) _____

Hijos e Hijas

11. _____ (relación) _____	12. _____ (relación) _____	13. _____ (relación) _____	14. _____ (relación) _____
15. _____ (relación) _____	16. _____ (relación) _____	17. _____ (relación) _____	18. _____ (relación) _____

Otros miembros-<u>menores</u> relacionados y no relacionados al grupo principal (describa la relación con el jefe del grupo)

19. _____ (relación) _____	20. _____ (relación) _____	21. _____ (relación) _____	22. _____ (relación) _____
19. _____ (relación) _____	20. _____ (relación) _____	21. _____ (relación) _____	22. _____ (relación) _____

Otros miembros-<u>adultos</u> relacionados y no relacionados al grupo principal (describa la relación con el jefe del grupo)

Information provided is for the solely purpose of this study only and will be treated with confidentiality safeguarding the identity of the informants

III. Household data

A. Main Household

1.Household Head -underline the representative-

name / tenancy-owner, renter, other-		
age / gender -male, female-		
relationship -spouse, partner, other-		
year of arrival		
educ.backgd. / occupation -element., intermed., h.school, college, grad.-		
present employment/years -employed, self-emp, unemp., retired, other-		

2.Other member(s) -continue in the other side of the page if needed-

name				
age / gender -male, female-				
relationship with h.head				
year joining household				
educ.level/occupation -element., intermed., h.school, college, grad.-				
present employment/years -employed, self-emp, unemp., retired, other-				
contribution to household -economic, maintenance, labor, other-				

B. Other household(s) -other family, relatives, friends, people, renters, etc. who live within the lot-

1.Head representative

name / tenancy-owner, renter, other-				
age / gender -male, female-				
relationship w/main head				
year of arrival				
educ.level/occupation -element., intermed., h.school, college, grad.-				
present employment/years -employed, self-emp, unemp., retired, other-				
contribution to household -economic, maintenance, labor, other--				

2.Other member(s) -continue in the other side of the page if needed-

name				
age / gender				
relationship with h.head B.				
year joining household				
educ.level/occupation -element., intermed., h.school, college, grad.-				
present employment/years -employed, self-emp, unemp., retired, other-				
contribution to household -economic, maintenance, labor, other-				

La información suministrada sirve al único propósito de este estudio y será tratada confidencialmente preservando la identidad de los informantes

III. Información del Grupo Residente

A. Grupo Residente Principal

1. Jefe del Grupo y Pareja del Jefe –subraye al jefe del grupo-

nombre / tenencia -propietario, arrendador, otro-		
edad / género -masculino, femenino-		
relación c/jefe -esposa, pareja, otro-		
año de llegada al grupo		
educación / ocupación -primaria, secund., técnica, universidad, grad.-		
empleo actual / años emp. -emplead, p/su cuenta, desemp, retirado, otro-		

2. Otros miembro(s) -continúe en el otro lado de la página si hace falta-

nombre				
edad / género -masculino, femenino-				
relación c/ jefe del grupo				
año de llegada al grupo				
educación /ocupación -primaria, secund., técnica, universidad, grad.-				
empleo actual / años emp. -emplead, p/su cuenta, desemp, retirado, otro-				
contribución al grupo -económico, mantenimiento, trabajo, otro-				

B. Otro grupo(s) - familiares, otra familia, amigos, otras personas, inquilinos, etc. que viven en la parcela-

1. Jefe o representante del grupo

nombre / tenencia -propietario, arrendador, otro-				
edad / género –masculino, femenino-				
relación c/grupo principal				
año de llegada al grupo				
educación /ocupación -primaria, secund., técnica, universidad, grad.-				
empleo actual / años emp. -emplead, p/su cuenta, desemp, retirado, otro-				
contribución al grupo -económico, mantenimiento, trabajo, otro-				

2. Otros miembro(s) -continúe en el otro lado de la página si hace falta-

nombre				
edad / género –masculino, femenino-				
relación c/jefe del grupo				
año de llegada al grupo				
educación /ocupación -primaria, secund., tecnica, universidad, grad.				
empleo actual / años emp. -emplead, p/su cuenta, desemp, retirado, otro-				
contribución al grupo -económico, mantenimiento, trabajo, otro-				

Information provided is for the solely purpose of this study only and will be treated with confidentiality safeguarding the identity of the informants

IV. House form data (use the aerial sequence to guide this section of the questionnaire)

I am going to show you a sequence of aerial photographs of your house in different times and I would like you to answer several questions about how your house was built from the beginning to what it is now.

A. Background

1. When did you come to this colonia? -year- _____
2. Why did you come to this colonia? _____
3. Where did you live before? -country, county, city- _____
4. For how long did you live there? -years, months- _____

B. Original structure

1. What was the first dwelling in this lot? (show first image in the aerial sequence, check all that apply)

   Structure built by current householder ☐ Temporary structure ☐ Camper ☐ Mobile ☐

   Structure built by previous householder ☐ Permanent structure ☐ Finished house ☐

   On site services at arrival electricity ☐ water ☐ sewer ☐ garbage ☐
2. When was the first structure built? -year-- _____
3. How long did it take to build? -number of years- _____
4. Approximately, how big was the structure? -area in sqf or sqm, measure two main dimensions if existent- _____
5. What materials were used for that first structure? -recycled materials, wood or metal framing, brick, cinder block, masonry, other- _____

   _____
6. How many rooms had and how were they used? -# separate rooms and functions in each of them (bedroom, living, dinning, kitchen, bathroom, porch, income, other)-

   _____
7. Why did you build this structure? -if built by present household- _____

   _____

C. Stage # 2

1. What did you do after your first house? –show the next image and identify additions, changes, and improvements made to the first structure.-

   _____
2. When was it built/made? -year-- _____
3. If addition, approximately how big was? -area in sqf or sqm, measure two main dimensions if existent- _____
4. What materials were used on the new structure? - recycled materials, wood or metal framing, brick, cinder block, masonry, other - _____

   _____
5. How many rooms were added and how were they used? -# rooms and functions in each (bedroom, living, dinning, kitchen, bathroom, porch, income, other)-

   _____
6. Why did you build or made this addition/change/improvement? -if built by present household- _____

   _____

D. Subsequent stages. (Repeat question set C for each stage identified in the aerial sequence)

La información suministrada sirve al único propósito de este estudio y será tratada confidencialmente preservando la identidad de los informantes

IV. Información de la Vivienda (use la secuencia aérea para guiar esta sección del cuestionario)

Voy a enseñarle una secuencia de fotos aéreas de su casa en diferentes momentos y quisiera que me contestara varias preguntas sobre como fué construida la casa desde el principio hasta lo que es ahora.

A. Historia

1. ¿Cuando vino a esta colonia? -año- _____
2. ¿Porqué vino a ésta colonia? _____
3. ¿Donde vivía antes? –país, condado, ciudad- _____
4. ¿Cuanto tiempo vivió allí? -años, meses- _____

B. Estructura Original

1. Cual fué la primera edificación construida en esta parcela? (enseñar primera imagen en la secuencia aérea, marcar todas las opciones válidas)

Estructura construida por el dueño actual	Estructura temporal	Camper	Casa móvil
Estructura construida por el dueño anterior	Estructura permanente		Casa culminada
Servicios en el lote al llegar electricidad	agua	drenajes	basura

2. ¿Cuando fué construida la primera estructura? -año- _____
3. ¿Cuanto tiempo tomó construirla? -número de años- _____
4. Aproximadamente, ¿de que tamaño era la estructura? -área en pies cuadrados o m2, mida dos dimensiones principales si existe- _____
5. ¿Que materiales se usaron en la estructura? -materiales reciclados, framing de madera o metal, ladrillo, bloque de concreto, enjarrado, otros- _____

   _____
6. ¿Cuantas habitaciones tenía y como eran usadas? -# espacios separados y funciones de cada uno de ellos (recamara, sala, comedor, cocina, baño, porche, tienda, otros)-

   _____
7. ¿Porqué construyó esa estructura? -en caso de ser construida por los habitantes actuales- _____

   _____

C. Etapa # 2

1. ¿Que construyó después de la primera casa? -enseñar la imagen siguiente e identificar adiciones, cambios, y mejoras hechas a la primera estructura-

   _____
2. ¿Cuando fué construida/hecha? -año- _____
3. En el caso de adición, ¿de que tamaño era? -área en pies cuadrados o m2, mida dos dimensiones principales si existe- _____
4. ¿Que materiales se usaron en la nueva estructura? - materiales reciclados, framing de madera o metal, ladrillo, bloque de concreto, enjarrado, otros - _____

   _____
5. ¿Cuantas habitaciones se añadieron y como eran usadas? -# cuartos añadidos y sus funciones (recamara, sala, comedor, cocina, baño, porche, tienda, otros)-

   _____
6. ¿Porqué construyó o hizo esta adición/cambio/mejora? -en caso de ser construida por los habitantes actuales- _____

   _____

D. Etapas subsiguientes. (Repetir grupo de preguntas C para cada etapa identificada en la secuencia aérea)

Information provided is for the solely purpose of this study only and will be treated with confidentiality safeguarding the identity of the informants

D. Stage # __

1. What did you do after the previous stage? –show the next image and identify additions, changes, and improvements made to the previous structure-

_____

2. When was it built/made? -year-- _____

3. If addition, approximately how big was? -area in sqf or sqm, measure two main dimensions if existent- _____

4. What materials were used on the new structure? - recycled materials, wood or metal framing, brick, cinder block, masonry, other - _____

_____

5. How many rooms were added and how were they used? -# rooms and functions in each (bedroom, living, dinning, kitchen, bathroom, porch, income, other)-

_____

6. Why did you build or made this addition/change/improvement? -if built by present household- _____

_____

D. Stage # __

1. What did you do after the previous stage? –show the next image and identify additions, changes, and improvements made to the previous structure-

_____

2. When was it built/made? -year-- _____

3. If addition, approximately how big was? -area in sqf or sqm, measure two main dimensions if existent-

4. What materials were used on the new structure? - recycled materials, wood or metal framing, brick, cinder block, masonry, other - _____

_____

5. How many rooms were added and how were they used? -# rooms and functions in each (bedroom, living, dinning, kitchen, bathroom, porch, income, other)-

_____

6. Why did you build or made this addition/change/improvement? -if built by present household- _____

_____

D. Stage # __

1. What did you do after the previous stage? –show the next image and identify additions, changes, and improvements made to the previous structure-

_____

2. When was it built/made? -year-- _____

3. If addition, approximately how big was? -area in sqf or sqm, measure two main dimensions if existent- _____

4. What materials were used on the new structure? -recycled materials, wood or metal framing, brick, cinder block, masonry, other - _____

_____

5. How many rooms were added and how were they used? -# rooms and functions in each (bedroom, living, dinning, kitchen, bathroom, porch, income, other)-

_____

6. Why did you build or made this addition/change/improvement? -if built by present household- _____

_____

La información suministrada sirve al único propósito de este estudio y será tratada confidencialmente preservando la identidad de los informantes

D. Etapa # __

1.¿Que construyó después de la etapa anterior? -enseñar la imagen siguiente e identificar adiciones, cambios, y mejoras hechas sobre la estructura previa- _____

_____

2.¿Cuando fué construida/hecha? -año- _____

3.En el caso de adición, ¿de que tamaño era? -área en pies cuadrados o m2, mida dos dimensiones principales si existe- _____

4.¿Que materiales se usaron en la nueva estructura? - materiales reciclados, framing de madera o metal, ladrillo, bloque de concreto, enjarrado, otros - _____

_____

5.¿Cuantas habitaciones se añadieron y como eran usadas? -# cuartos añadidos y sus funciones (recamara, sala, comedor, cocina, baño, porche, tienda, otros)-

_____

6.¿Porqué construyó o hizo esta adición/cambio/mejora? -en caso de ser construida por los habitantes actuales- _____

_____

D. Etapa # __

1.¿Que construyó después de la etapa anterior? -enseñar la imagen siguiente e identificar adiciones, cambios, y mejoras hechas sobre la estructura previa- _____

_____

2.¿Cuando fué construida/hecha? -año- _____

3.En el caso de adición, ¿de que tamaño era? -área en pies cuadrados o m2, mida dos dimensiones principales si existe- _____

4.¿Que materiales se usaron en la nueva estructura? - materiales reciclados, framing de madera o metal, ladrillo, bloque de concreto, enjarrado, otros - _____

_____

5.¿Cuantas habitaciones se añadieron y como eran usadas? -# cuartos añadidos y sus funciones (recamara, sala, comedor, cocina, baño, porche, tienda, otros)-

_____

6.¿Porqué construyó o hizo esta adición/cambio/mejora? -en caso de ser construida por los habitantes actuales- _____

_____

D. Etapa # __

1.¿Que construyó después de la etapa anterior? -enseñar la imagen siguiente e identificar adiciones, cambios, y mejoras hechas sobre la estructura previa- _____

_____

2.¿Cuando fué construida/hecha? -año- _____

3.En el caso de adición, ¿de que tamaño era? -área en pies cuadrados o m2, mida dos dimensiones principales si existe- _____

4.¿Que materiales se usaron en la nueva estructura? - materiales reciclados, framing de madera o metal, ladrillo, bloque de concreto, enjarrado, otros - _____

_____

5.¿Cuantas habitaciones se añadieron y como eran usadas? -# cuartos añadidos y sus funciones (recamara, sala, comedor, cocina, baño, porche, tienda, otros)-

_____

6.¿Porqué construyó o hizo esta adición/cambio/mejora? -en caso de ser construida por los habitantes actuales- _____

_____

Information provided is for the solely purpose of this study only and will be treated with confidentiality safeguarding the identity of the informants

E. Final stage

1. What are the most recent improvements made to your house –probably not shown in the aerial- _____

_____

2. When were they built/made? -year-- _____

3. If addition, approximately how big was? -area in sqf or sqm, measure two main dimensions if existent- _____

4. What materials were used on the new structure? - recycled materials, wood or metal framing, brick, cinder block, masonry, other - _____

_____

5. How many rooms were added and how were they used? -# rooms and functions in each (bedroom, living, dinning, kitchen, bathroom, porch, income, other)-

_____

6. Why did you build or made this addition/change/improvement? -if built by present household- _____

_____

F. Future Stages

1. What are your plans for future improvements to your house _____

_____

2. When do you plan to build/made them? -year-- _____

3. If addition, approximately how big will it be? -area in sqf or sqm- _____

4. What materials will be used on the new structure? _____

_____

5. How many rooms will be added and how will be used? -# rooms and functions in each (bedroom, living, dinning, kitchen, bathroom, porch, income, other)-

_____

6. Why have you planed to make this addition/change/improvement? _____

_____

E. House form complementary information

1. Present on-site services	electricity	water	sewer	garbage
Year service provided	_____	_____	_____	_____
Monthly cost of service	_____	_____	_____	_____

2. Do you have any other house expenditure not mentioned here? –maintenance, paint, etc- _____

_____

3. Do you remember how much did you pay for you initial house? _____

4. How much do you think you have invested into your house? _____

_____

5. How much do you think your current house is worth? _____

6. For how much would you sell your house? _____

Thank you very much for your cooperation with this study. Could we come in the future to ask additional questions? Yes No

La información suministrada sirve al único propósito de este estudio y será tratada confidencialmente preservando la identidad de los informantes

E. Etapa final

1.¿Cuales son las mejoras mas recientes hechas en su casa? -probablemente no visibles en fotos aéreas- _____

_____

2.¿Cuando fué construida/hecha? -año- _____

3.Si es una adición, ¿de qué tamaño es aproximadamente? -área en pies cuadrados o m2, mida dos dimensiones principales si existe - _____

4.¿Que materiales se usaron en la nueva estructura? - materiales reciclados, framing de madera o metal, ladrillo, bloque de concreto, enjarrado, otros - _____

_____

5.¿Cuantas habitaciones se añadieron y como son usadas? -# cuartos añadidos y sus funciones (recamara, sala, comedor, cocina, baño, porche, tienda, otros)-

_____

6.¿Porqué construyó o hizo esta adición/cambio/mejora? -en caso de ser construida por los habitantes actuales- _____

_____

F. Futuras etapas

1.¿Cuales son sus futuros planes para mejorar su casa? _____

_____

2.¿Cuando planea construirlas/hacerlas? -año- _____

3.Si es una adición, ¿de qué tamaño será? área en pies cuadrados o m2- _____

4.¿Que materiales se usarán en la nueva estructura? _____

_____

5.¿Cuantas habitaciones serán añadidas y como serán usadas? -# cuartos a añadir y funciones (recamara, sala, comedor, cocina, baño, porche, tienda, otros)-

_____

6.¿Porqué ha planeado hacer esta adición/cambio/mejora? _____

_____

E. Información complementaria de la vivienda

1.Servicios presentes en el lote	electricidad	agua	drenajes	basura
Año de conexión del servicio	_____	_____	_____	_____
Costo mensual del servicio	_____	_____	_____	_____

2.¿Hay algún costo relacionado con la casa que no haya mencionado aquí? –mantenimiento, pintura, etc- _____

_____

3.¿Recuerda cuánto pago inicialmente por su casa? _____

4.¿Cuánto cree usted que ha invertido en su casa? _____

_____

5.¿Cuánto cree que vale su casa? _____

6.¿Por cuánto vendería su casa? _____

Muchas gracias por su cooperación con este estudio. ¿Podríamos volver en un futuro a realizar preguntas adicionales? Yes No

Podría darnos un numero de teléfono donde contactarlo para una futura entrevista? _____

Cual serian los mejores días y horas del día donde llamarlo para futura entrevista? _____
_____

Can we have a phone number to contact you for a future interview? _____

What would be the best days and time of the day to call you for a future interview? _____
_____

INTERVIEWEE INCENTIVE INVOICE

Please PRINT Neatly As You Complete This Section:

Today's Date: _____

Recipient's Name: _____SSN:_____

Recipient's Mailing Address: _____

Recipient's City, State, and Zip Code: _____

Recipient's Home Phone: _____Work Phone: _____

Recipient's Signature: _____

For Internal Use Only:

Reason for payment: _____Completion of Survey Questionnaire_____

Household ID Code: _____ Amount of Payment: _____$10 Card_____

Housing Diversity and Consolidation in Colonias
Texas A&M University, Dept. of Architecture.

Guide for the Interviewer February, 2007.

Introduction

This guide provides supplementary information that needs to be known by the interviewer to complete the survey of the research above titled. It is important that interviewers follow always the same procedure and interviewing protocol in completing each survey to ensure the quality and compatibility of the data collected.

Survey Material

Each interviewer will be provided with a survey package that includes: this guide, a list of household addresses with twice the number of interviews to be made (in case some households can not be interviewed), sequences of aerial pictures of each of the houses listed, survey forms to interview the designated households, pens, and survey board.

Survey Scheduling

Survey schedules will be planed and organized by the interviewer according to colonia location, number of interviews per colonia, and interview arrangements. Interviews will be arranged approaching the household listed and asking for the household head or adult partner. If any of them is present, the interviewer will read the introductory information sheet and, if accepted, proceed to the interview. If none of them is present, another visit will be scheduled whenever any of them is available, and the introductory information sheet will be detached from the survey and left with the household resident who made the initial contact. If a designated household denies the interview, a check will be made in the "denies survey" box of the list of household address and the interviewer will proceed to the next arranged interview.

Interviewing procedure

The information needed to complete the interview is contained in the survey. All the text in large fonts is to be read to the interviewee. The text in the small font describes categories to be suggested to the interviewee as options for their answers. One of these categories would constitute a better answer. All these categories are better explained in the next section of this guide. However, if the interviewee does not find any of these words to describe his/her answer, then the words of their choice should be used.

The interviewer should pay attention to negative reactions to any of the questions. If a negative reaction is detected, the interviewer should ask if the specific question makes the interviewee uncomfortable and offer to clarify any doubt raised by the question. If the interviewee is not comfortable with the explanations given, the interviewer will give the choice to leave the question unanswered and pass onto the next question. If the situation is repeated more than ten (10) times, the interviewer will offer the interviewee to stop the survey. If the interviewee prefers to leave the survey incomplete, the interviewer will present the gift card or similar small gift to the interviewee and check the box "incomplete survey" in the list of household addresses. Households who complete the survey will be presented the gift card or similar small gift and the box "completed survey" should be checked in the list of household addresses.

Diversidad y Consolidación de la Vivienda en Colonias
Texas A&M University, Depto. de Arquitectura.

Guía para el/la Encuestador/a Febrero, 2007.

Introducción

Esta guía contiene información suplementaria que el/la encuestador/a necesita conocer para completar la encuesta de la investigación nombrada en el titulo. Es importante que el/la encuestador/a siga siempre el mismo procedimiento y protocolo de entrevista al completar cada encuesta para asegurar la calidad y compatibilidad de los datos recogidos.

Material de Encuesta

Cada encuestador/a recibirá un paquete de encuestador que incluye: esta guía, una lista de direcciones de viviendas con el doble de las entrevistas a realizarse (en el caso de que algunas viviendas no puedan ser entrevistadas), secuencias de imágenes aéreas de cada una de las viviendas listadas, formas de encuestas para entrevistar a las viviendas designadas, plumas, y una tableta de encuestador.

Agenda de Entrevistas

Las entrevistas serán planeadas y organizadas por el encuestador/a y su supervisor/a de acuerdo a la localización de la colonia, número de encuestas por colonia, y arreglos para las entrevistas. Las entrevistas serán realizadas contactando a los residentes de la vivienda y preguntando por el jefe del grupo residente o su pareja adulta. Si cualquiera de ellos está presente, el encuestador leerá la hoja de información introductoria y, al ser aceptada, procederá a la realizar la encuesta. Si ninguna de las personas mencionadas se encuentra presente, se acordará una próxima visita cuando alguno de ellos se encuentre disponible y se dejará la hoja de información introductoria de la encuesta con el residente con el que se haga el primer contacto. Si el representante del grupo residente niega ser entrevistado, se marcará una equis en el cuadro que indica “denies survey” en la lista de direcciones de viviendas y el encuestador procederá a la siguiente entrevista planeada.

Procedimiento de Encuesta

La información necesaria para completar la entrevista se encuentra escrita en la encuesta. El texto en letras grandes debe ser leído a la persona entrevistada. El texto en letras pequeñas describe categorías a sugerir como opción a las respuestas. Cualquiera de estas categorías sería una respuesta aceptable. Todas estas categorías están mejor explicadas en la sección siguiente de esta guía. Sin embargo, si la persona encuestada no encuentra que alguna de estas categorías describe su respuesta, entonces escriba la respuesta dada por la persona en la encuesta.

El/la encuestador/a debe estar atento a reacciones negativas a cualquiera de las preguntas. Si se observa una reacción negativa, el encuestador/a debe preguntar si la pregunta que se está realizando es incómoda para la persona entrevistada y ofrecer aclarar cualquier duda que la pregunta origine. Si la explicación dada no satisface a la persona entrevistada, el encuestador dará la opción de dejar la pregunta sin contestar y pasará a la siguiente pregunta. Si esta situación se repite mas de diez (10) veces, el/la encuestador/a ofrecerá parar la entrevista. Si la persona encuestada prefiere dejar la entrevista incompleta, el/la encuestador/a entregara la gift card o pequeño obsequio similar a la persona entrevistada y marcará una equis en el cuadro “incomplete survey” de la lista de direcciones. Las personas entrevistadas que completen la encuesta recibirán la gift card o pequeño obsequio similar y el encuestador marcará una equis en el cuadro “completed survey” de la lista de direcciones.

Sections of the Survey

I. Household identification: identify *House Address* including colonia, street, and lot.

II.Household chart: draw a tree diagram of the household starting with the names of the *household head* and *household head partner* at the top, and going with the names of the closest down to names of the farthest relatives, including unrelated members of the household at the lowest levels of the tree. Include the *relationship* of each member with the household head or, if none, any other member of the household.

III.Household data:

A.Main Household

1. Household Head**:** write the *name* and *tenancy(owner* or *propietario, renter* or *alquilado, other)*, the *age* in years and *gender (male* or *masculino, female* or *femenino)*, the declared *relationship (spouse* or *esposa, partner* or *pareja, other* or *otro)*, the *year of arrival*, the *education background (elementary* or *primaria, intermediate, high school* or *secundaria, college* or *universidad, graduate* or *graduada)* and *occupation* of each household head member, and the *present employment (employed* or *empleado, self-employed* or *por su cuenta, unemployed* or *desempleado, retired* or *retirado, other* or *otro)* and *years* in the present employment.
2. Other member (s): write the *name*, the *relationship with the household head* (son, daughter, nephew, grandson, granddaughter, brother, cousin, brother in law, etc.), the *year joining the household*, the *education background (elementary* or *primaria, intermediate, high school* or *secundaria, college* or *universidad, graduate* or *graduada)* and *occupation* of each household head member, the *present employment (employed* or *empleado, self-employed* or *por su cuenta, unemployed* or *desempleado, retired* or *retirado, other* or *otro)* and *years* in the present employment, and the *contribution to the household (economic* or *economico, maintenance* or *mantenimiento, labor* or *trabajo, other* or *otro).*

B.Other Household (s)

1. Head representative**:** write the *name* and *tenancy(owner* or *propietario, renter* or *alquilado, other)*, the *age* in years and *gender (male* or *masculino, female* or *femenino)*, the *relationship with main household* (brother or hermano, cousin or primo, friend or amigo, none or ninguna, other or otro), the *year of arrival*, the *education background (elementary* or *primaria, intermediate, high school* or *secundaria, college* or *universidad, graduate* or *graduada)* and *occupation* of each household head member, and the *present employment (employed* or *empleado, self-employed* or *por su cuenta, unemployed* or *desempleado, retired* or *retirado, other* or *otro)* and *years* in the present employment, and the *contribution to the household (economic* or *economico, maintenance* or *mantenimiento, labor* or *trabajo, other* or *otro).*
2. Other member (s): write the *name*, the *relationship with the household head* (son, daughter, nephew, grandson, granddaughter, brother, cousin, brother in law, etc.), the *year joining the household*, the *education background (elementary* or *primaria, intermediate, high school* or *secundaria, college* or *universidad, graduate* or *graduada)* and *occupation* of each household head member, the *present employment (employed* or *empleado, self-employed* or *por su cuenta, unemployed* or *desempleado, retired* or *retirado, other* or *otro)* and *years* in the present employment, and the *contribution to the household (economic* or *economico, maintenance* or *mantenimiento, labor* or *trabajo, other* or *otro).*

IV.House form data:

A.Background

1. Year in which the main household came to this colonia
2. The reasons for coming to this colonia
3. The place *(country* or *pais, county* or *condado, city* or *ciudad)* where the main household lived before.
4. The time *(years* or *anos, months* or *meses)* living in the previous place.

Secciones de la Encuesta

I. Identificación del Grupo Residente: identificar *Dirección de la Vivienda* incluyendo colonia, calle, y número de parcela.

II.Hoja del Grupo Residente: hacer un diagrama del grupo residente comenzando con los nombres del *Jefe del grupo residente* y *Pareja del Jefe del grupo* arriba, y siguiendo con los nombres de los parientes más cercanos a los más lejanos, incluir miembros no relacionados con la familia en los niveles inferiores del diagrama. Incluir la *relación* de cada miembro con el jefe del grupo residencial o, si no existe ninguna, la relación con cualquier otro miembro del grupo.

Información del Grupo Residente:

A.Grupo Residente Principal

1. Jefe del Grupo y Pareja del Jefe**:** escribir el *nombre* y *tenencia* *(owner* o *propietario, renter* o *alquilado, otro)*, la *edad* en años y *género* *(male* o *masculino, female* o *femenino)*, la *relación con el jefe* *(spouse* o *esposa, partner* o *pareja, other* o *otro)*, el *año de llegada al grupo*, el nivel de *educación* *(elementary* o *primaria, intermediate, high school* o *secundaria, college* o *universidad, graduate* o *graduada)* y *ocupación* de cada miembro jefe de grupo, y en el *empleo actual* *(employed* o *empleado, self-employed* o *por su cuenta, unemployed* o *desempleado, retired* o *retirado, other* o *otro)* y *años* en el empleo actual.
2. Otros miembro (s): escribir el *nombre*, la *relación con el jefe del grupo* (hijo, hija, sobrino/a, nieto/a, hermano/a, primo/a, cuñado/a, etc.), el *año de llegada al grupo*, el nivel de *educación* *(elementary* o *primaria, intermediate, high school* o *secundaria, college* or *universidad, graduate* o *graduada)* y *ocupación* de cada miembro del grupo, el *empleo actual* *(employed* o *empleado, self-employed* o *por su cuenta, unemployed* o *desempleado, retired* o *retirado, other* o *otro)* y los *años* en el empleo actual, y la *contribución al grupo* *(economic* o *económico, maintenance* o *mantenimiento, labor* o *trabajo, other* o *otro).*

B.Otro grupo (s)

1. Jefe o representante del grupo (s)**:** escribir el *nombre* y *tenencia* *(owner* o *propietario, renter* o *alquilado, otro)*, la *edad* en años y *género* *(male* or *masculino, female* or *femenino)*, la *relación con el grupo principal* (brother o hermano, cousin o primo, friend o amigo, none o ninguna, other o otro), el *año de llegada al grupo*, el nivel de *educación* *(elementary* o *primaria, intermediate, high school* o *secundaria, college* o *universidad, graduate* o *graduada)* y *ocupación* de cada miembro jefe del grupo, y el *empleo actual* *(employed* o *empleado, self-employed* o *por su cuenta, unemployed* o *desempleado, retired* o *retirado, other* o *otro)* y *años* en el empleo actual, y la *contribución al grupo* *(economic* o *económico, maintenance* o *mantenimiento, labor* o *trabajo, other* o *otro).*
2. Otros miembro (s): escribir el *nombre*, la *relación con el jefe del grupo* (hijo, hija, sobrino/a, nieto/a, hermano/a, primo/a, cuñado/a, etc.), el *año de llegada al grupo*, el nivel de *educación* *(elementary* o *primaria, intermediate, high school* o *secundaria, college* o *universidad, graduate* o *graduada)* y *ocupación* de cada miembro, el *empleo actual* *(employed* o *empleado, self-employed* o *por su cuenta, unemployed* o *desempleado, retired* o *retirado, other* o *otro)* y *años* en el empleo actual, y la *contribución al grupo* *(economic* o *economico, maintenance* o *mantenimiento, labor* o *trabajo, other* o *otro).*

IV.Información de la Vivienda:

A.Historia

1. El año en que el grupo principal vino a esta colonia
2. Las razones para venir a esta colonia
3. El lugar *(country* o *pais, county* o *condado, city* o *ciudad)* en el que el grupo principal vivía antes.
4. Cuanto tiempo *(years* o *años, months* o *meses)* vivió en el lugar anterior.

B.Original structure
1. Mark the box or boxes describing the first structure(s) built in the lot.
2. Year in which the structure was built or placed in the lot.
3. Time that took to be built *(years,* if one year or less then 1 year*)*
4. The approximate size of the structure *(area in sqf* or *pies cuadrados, sqm* or *m2)*
5. Name materials used in the structure
6. Number of rooms in the structure and function developed in each room.
7. Reasons to build the structure

C.Stage # 2
1. Name the structure that followed the first one.
2. Year in which the structure was built or placed in the lot.
3. The approximate size of the structure added *(area in sqf* or *pies cuadrados, sqm* or *m2)*
4. Name materials used in the new structure
5. Number of rooms added with the structure and function developed in each room.
6. Reasons to build the structure, made the change, or the improvement.

D.Subsequent stages (number each following stage)
1. Name the structure that followed the last one.
2. Year in which the structure was built or placed in the lot.
3. The approximate size of the structure added *(area in sqf* or *pies cuadrados, sqm* or *m2)*
4. Name materials used in the new structure
5. Number of rooms added with the structure and function developed in each room.
6. Reasons to build the structure, made the change, or the improvement.

E.Final stage
1. Name the most recent improvement made to the house
2. Year in which the improvement was built or made in the lot.
3. The approximate size of the structure added *(area in sqf* or *pies cuadrados, sqm* or *m2)*
4. Name materials used in the new structure
5. Number of rooms added with the structure and function developed in each room.
6. Reasons to build the structure, made the change, or the improvement.

F.Future stages
1. Name if there are any plans to improve the house.
2. Year from now in which plans will be built/made.
3. If a structure will be added name its approximate size *(area in sqf* or *pies cuadrados, sqm* or *m2)*
4. Name materials to be used in the new structure
5. Number of rooms that will be added and function to be developed in each room.
6. Reasons to plan building the structure, made the change, or the improvement.

E.House form complementary information
1. Mark boxes of present services, and name year that the service was connected and the monthly cost of each service.
2. Include other expenses related with the house that are not covered by this survey.
3. Name the cost in currency of the land and/or structure purchased initially.
4. Make an estimate of the cost of all the improvement made to the house.
5. Make an estimate of how much would others would pay for your house.
6. Name the price you would be willing to sell your house.

If there are additional questions or clarifications to any of the contents of this guide, call or leave a message to PI Carlos Reimers at (979) 4580445 or (979) 7641573 at any time.-

B.Estructura Original
1. Marque el cuadro o cuadros que describan la primera estructura construida en el lote.
2. Año en que la estructura fue construida o traída al lote.
3. Tiempo que tomó construirla *(años,* si es un año o menos entonces escribir 1 año)
4. Tamaño aproximado de la estructura *(área en sqf* o *pies cuadrados, sqm* o *m2)*
5. Nombre los materiales utilizados en la estructura
6. Numero de cuartos en la estructura y uso de cada cuarto.
7. Razones para construir la estructura

C.Etapa # 2
1. Nombre la estructura/cambio/o mejora que se hizo después.
2. Año en que la estructura/cambio/o mejora fue construida, traída al lote, o hecha.
3. Tamaño aproximado de la estructura *(área en sqf* o *pies cuadrados, sqm* o *m2)*
4. Nombre los materiales utilizados en la estructura/cambio/o mejora.
5. Numero de cuartos que fueron añadidos y uso de cada cuarto.
6. Razones para construir la estructura, realizar algún cambio, o hacer una mejora.

D.Etapas subsiguientes (numere cada etapa sucesiva)
1. Nombre la estructura/cambio/o mejora que se hizo después.
2. Año en que la estructura/cambio/o mejora fue construida, traída al lote, o hecha.
3. Tamaño aproximado de la estructura *(área en sqf* o *pies cuadrados, sqm* o *m2)*
4. Nombre los materiales utilizados en la estructura/cambio/o mejora.
5. Numero de cuartos que fueron añadidos y uso de cada cuarto.
6. Razones para construir la estructura, realizar algún cambio, o hacer una mejora.

E.Etapa final
1. Adición, cambio, o mejora más reciente hecha a la vivienda
2. Año en que la estructura/cambio/o mejora fue construida, traída al lote, o hecha.
3. Tamaño aproximado de la estructura *(área en sqf* o *pies cuadrados, sqm* o *m2)*
4. Nombre los materiales utilizados en la estructura/cambio/o mejora.
5. Numero de cuartos que fueron añadidos y uso de cada cuarto.
6. Razones para construir la estructura, realizar algún cambio, o hacer una mejora.

F.Etapas futuras
1. Planes para mejorar la vivienda.
2. Año en que estos planes se construirán/harán.
3. Si es una nueva estructura escribir tamaño aproximado *(área en sqf* o *pies cuadrados, sqm* o *m2)*
4. Nombre los materiales a ser utilizados en la estructura/cambio/o mejora.
5. Numero de cuartos que serán añadidos y uso previsto en cada cuarto.
6. Razones para planear construir la estructura, realizar el cambio, o hacer la mejora.

E.Información complementaria de la vivienda
1. Marque los cuadros correspondientes a los servicios presentes, y escriba año en que el servicio fue conectado y el costo aproximado de cada servicio.
2. Incluir otros gastos relacionados con la vivienda que no estén mencionados en esta encuesta.
3. Escribir el costo monetario del lote de tierra y/o la estructura comprada inicialmente.
4. Estimado del jefe del grupo del monto monetario de todas las mejoras hechas a la casa.
5. Estimado del jefe del grupo de cuanto pagarían otras personas por esa vivienda.
6. Estimado del jefe del grupo de por cuanto estaría dispuesto a vender la vivienda.

Si tiene alguna pregunta o necesita alguna aclaratoria sobre el contenido de esta guía, llamar o dejar mensaje a IP Carlos Reimers (979) 4580445 o (979) 7641573 a toda hora.-

ENCUESTA

Diversidad y Consolidación de la Vivienda en Colonias
Texas A&M Colonias Program, Texas A&M University

Las **Promotoras del Centro Comunitario de Larga Vista** están haciendo una encuesta sobre el desarrollo de la vivienda en varias colonias. La encuesta es parte de un estudio para definir la forma en que la vivienda se construye a través del tiempo en las colonias, y como los residentes participan en el proceso de construirla.

La encuesta toma unos 30 minutos en ser completada y los participantes recibirán una gift card de Walmart por 10 dólares.

La encuesta es totalmente voluntaria y anónima. Si esta interesado en participar, por favor llamar al numero _____

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VITA

Carlos Alberto Reimers-Arias received a Bachelor of Architecture professional degree from Simón Bolívar University-Caracas in 1987. He later completed a Master of Architecture degree at McGill University in 1993 and a Master of Science in Urban Studies and Planning at the Massachusetts Institute of Technology in 2002. He received his Ph.D. in Architecture at Texas A&M in August 2009. He has researched extensively on housing in developing areas focusing on affordable and low-cost housing, progressive development and incremental housing, collective and multifamily residential planning and design, and formal and informal housing in North America, Latin America and Asia.

Before joining A&M, he was a faculty member at Simón Bolívar University in Caracas for 8 years and Chair of the School of Architecture between 1997 and 2001. He is a registered architect in Venezuela where he developed a professional practice for many years and an International Associate of the American Institute of Architects. He was housing senior advisor for several non-governmental organizations working in housing and instructor on housing issues for NGOs and community organizations. He was also a consultant in social housing for the Inter-American Development Bank and the Venezuelan government. His design work has received recognition in several design competitions, and his research work presented in national and international conferences, as well as published in several scholarly journals and publications.

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